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ORAL
HARD TISSUE
DISEASES

A Reference Manual for Radiographic Diagnosis

2nd
Edition

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J. Robert Newland, DDS, MS

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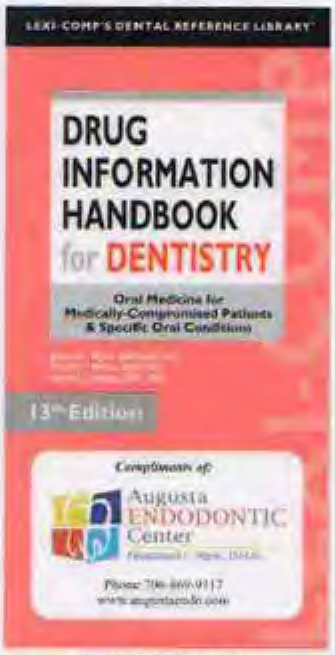
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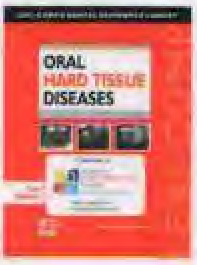

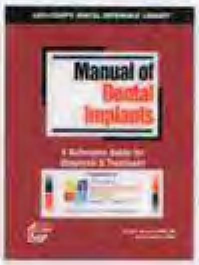

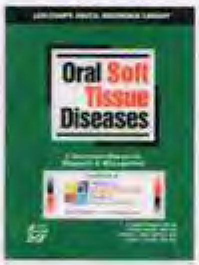

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ABOUT THE AUTHOR

J. Robert Newland, DDS, MS

After more than 20 years as a dental educator, Dr Newland recently left academic dentistry to devote himself to his private practice in Houston, Texas. Before leaving academic dentistry, Dr Newland served in both faculty and administrative positions at the University of Texas Health Science Center at Houston, Dental Branch, including Chair of the Department of Diagnostic Sciences and Associate Dean for Student Affairs. Dr Newland graduated from the University of Texas in 1966 and received a Doctor of Dental Surgery Degree from the University of Texas Health Science Center at Houston, Dental Branch, in 1970. He completed an Advanced Education Program in Oral Pathology at the University of Texas Health Science Center at Houston, Dental Branch, and received a Master of Science Degree in Oral Pathology in 1978. Dr Newland also completed a fellowship in Oral Pathology at the MD Anderson Cancer Center. He has written more than 100 scientific publications on a variety of topics related to his specialty, including benign and malignant oral tumors, oral manifestations of HIV infection and AIDS, oral manifestations of systemic diseases, and the diagnosis and treatment of oral soft tissue diseases. Dr Newland has presented more than 100 continuing education seminar to dental and medical healthcare providers. He has maintained an active private practice for more than 18 years where he manages patients with a wide range of oral diseases.

PREFACE

The discovery, on routine dental radiographs, of lesions growing in bone, occurs almost daily in a busy dental practice. Depending on the presence or absence of calcified material, these lesions can appear radiolucent, partially radiopaque (radiolucent-radiopaque) or completely radiopaque. Occasionally, an accurate diagnosis can be based solely on the radiographic features of a lesion. More often, however, careful correlation of clinical, radiographic, and in many cases, microscopic features is necessary to confirm the diagnosis. ***Oral Hard Tissue Diseases: A Reference Manual for Radiographic Diagnosis*** is designed to present the radiographic features of intraosseous lesions discovered on dental radiographs in a format that the busy dental practitioner will find especially helpful. Several lesions have been added to this 2nd edition. Some were added at the suggestion of professional colleagues who found the first edition very valuable in their clinical practices. One of the lesions, "Bisphosphonate-related Osteonecrosis of the Jaws," was included because dental practitioners are encountering it with increased frequency. I hope these additions will be beneficial and increase the usefulness of this new edition.

Each of the next eleven sections of the manual is devoted to a specific diagnostic category including periapical radiolucent lesions, pericoronal radiolucent lesions, inter-radicular radiolucent lesions, periodontal radiolucent lesions, radiolucent lesions not associated with teeth, radiolucent lesions with irregular margins, periapical radiopaque lesions, pericoronal radiopaque lesions, inter-radicular radiopaque lesions, radiopaque lesions not associated with teeth, and radiopaque lesions with irregular margins. Each of the lesions included in a diagnostic category is illustrated with one or more high quality black and white photographs intended to depict typical radiographic features.

Of course, the diagnostic process is never as simple as matching a radiograph with an illustration in a book. However, recognizing the key radiographic features of a lesion is an essential step in establishing a diagnosis. The information presented in ***Oral Hard Tissue Diseases: A Reference Manual for Radiographic Diagnosis*** will assist you in recognizing those features.

J. Robert Newland

CENTRAL GIANT CELL GRANULOMA

SYNONYMS

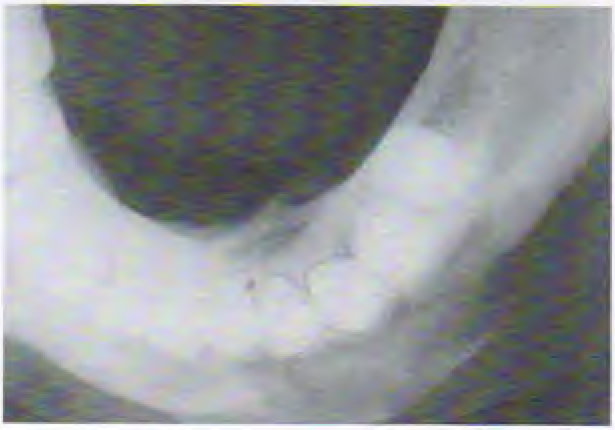
- Central giant cell lesion
- Central giant cell tumor

ETIOLOGY

- A reactive granulomatous proliferation containing multinucleated giant cells (generally thought to be osteoblasts)
- May represent a reparative response to inflammation within bone.

TYPICAL RADIOGRAPHIC FEATURES

- A unilocular or multilocular radiolucent lesion with circumscribed or indistinct margins
- Commonly located in the anterior mandible.
- Can cross the midline.



A central giant cell granuloma in the anterior mandible. The lesion caused expansion of the cortex.

OTHER USEFUL CLINICAL INFORMATION

- More common in young adults.
- More common in females.
- There may be cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Cemento-osseous dysplasia
- Ameloblastoma
- Odontogenic keratocyst
- Central arteriovenous malformation

DIAGNOSTIC STEPS

- Multilocular lesions should be aspirated prior to surgery to rule out the possibility of a vascular lesion.
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Curettage is the treatment of choice for smaller lesions.
- Surgical excision may be necessary for larger lesions.
- Intralesional corticosteroid injections have been proposed as an alternative to surgical therapy.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- May be associated with aneurysmal bone cyst.
- May occasionally behave in a more aggressive fashion (central giant cell tumor).
- Microscopically identical to the "brown tumor" of hyperparathyroidism.

INTRODUCTION

Lesions growing in bone alter the osseous structure. These alterations are typically visible on radiographs. Diseases which destroy or deform the normal trabecular architecture of the bone produce lesions which are radiolucent on x-rays. In the jaws, radiolucent lesions can result from inflammatory proliferations, reactive or developmental cysts, and neoplasms. Diseases which synthesize calcified material produce lesions which are partially or completely radiopaque. In the jaws, this calcified material can be bone, cartilage, or tooth structure (cementum, dentin, and enamel). Some diseases affecting the maxilla and mandible are initially composed entirely of soft tissues and appear radiolucent, but eventually they form hard tissue and appear radiopaque. Diseases affecting the maxilla and mandible can arise primarily within the bone, or spread to the bone from distant anatomic sites. Compared to other bones of the skeleton, the diagnosis of lesions involving the maxilla and mandible can be a greater diagnostic challenge because they contain teeth. A wide variety of diseases can be associated with teeth and the tooth-forming apparatus.

This reference manual is designed to help you identify radiographic features of diseases which appear on dental radiographs. It is important to remember that the interpretation of radiographic features is only one component of the diagnostic process. The clinical presentation and, in many cases, the microscopic features of the disease are also important considerations. If biopsy is indicated, referral to a specialist (oral and maxillofacial surgeon, periodontist, or endodontist) may be appropriate. It is also necessary to assess results of treatment and re-evaluate the patient at appropriate intervals.

The purpose of this reference manual is to present the information necessary to diagnose and manage oral hard tissue diseases. The first section of the manual includes information about the diagnostic process (obtaining a history, examining the patient, recording historical and clinical data, establishing a differential diagnosis), and selecting appropriate diagnostic procedures.

This manual is divided into 11 sections of lesions each representing a specific diagnostic category. These diagnostic categories include:

1. Periapical radiolucent lesions
2. Pericoronal radiolucent lesions
3. Inter-radicular radiolucent lesions
4. Periodontal (alveolar) radiolucent lesions
5. Radiolucent lesions not associated with teeth
6. Radiolucent lesions with irregular margins
7. Periapical radiopaque lesions
8. Pericoronal radiopaque lesions
9. Inter-radicular radiopaque lesions
10. Radiopaque lesions not associated with teeth
11. Radiopaque lesions with irregular margins

In each diagnostic category, the specific lesions are divided into two groups - those which are relatively common and those which are relatively uncommon.

On the pages that follow, each tab represents the general diagnostic category of the lesions included. It should be remembered that these diagnostic categories are somewhat arbitrary and that there may be overlap between diagnostic categories. Many of these intra-osseous lesions can appear in more than one category because of their varied anatomic distribution or because they can be radiolucent, mixed, or radiopaque at different stages in their development.

The manual is organized in a format that will be easily accessible to you. For each disease included in a diagnostic category, the following information is presented:

- The most common name for the lesion
- Synonyms for the lesion including alternative naming schemes that may have historical importance (thus facilitating communication among clinicians)
- A brief discussion of the etiology
- One or more images of a typical lesion with a description of the clinical features emphasizing those of greatest diagnostic value (the most common radiographic manifestations as well as typical clinical variations are presented)
- Other useful clinical information including symptoms and epidemiologic date
- Radiographic differential diagnosis
- Appropriate diagnostic steps
- Clinical significance (eg, could the lesion indicate the presence of a serious systemic disease or could it be potentially life-threatening)

THE DIAGNOSTIC PROCESS

The first step in the diagnostic process of oral hard tissue diseases is to have the patient complete a health questionnaire. The health questionnaire should provide information that will enable you to assess the patient's:

- overall health status (general health)
- disease history (serious illnesses, hospitalizations, surgical procedures)
- current medications (over-the-counter and prescription)
- allergies (drugs, foods, other)
- social history (tobacco, alcohol, and/or recreational drug exposure)
- family history (health status of family members)

The health questionnaire should also contain a place for the patient to describe his/her chief complaint.

Next, you should interview the patient to obtain a complete history. Information provided by the patient in the health questionnaire will serve as a guide for the interview. The patient history should include the following:

- **Chief Complaint**

  If the patient is aware of the lesion and a description of it in the patient's own words.

- **History of Present Illness**

  Onset of the lesion - how long has the lesion been present? In general, lesions which persist for more than a few weeks are of greater concern.

  Clinical course of the lesion - has the lesion increased in size, decreased in size, fluctuated in size, or remained stable?

  Symptoms of the lesion - is the lesion painful? In the absence of pain, the patient may not be aware of the lesion. This is significant because oral cancers are often initially painless. Is the lesion associated with paresthesia?

- **Relevant Medical History**

  Is there anything in the patient's medical history that might contribute to the diagnosis?

  Is the patient taking any medications that could be involved in the oral changes?

- **Relevant Dental History**

  Is there anything in the patient's dental history that might contribute to the diagnosis (eg, prostheses, appliances, trauma)?

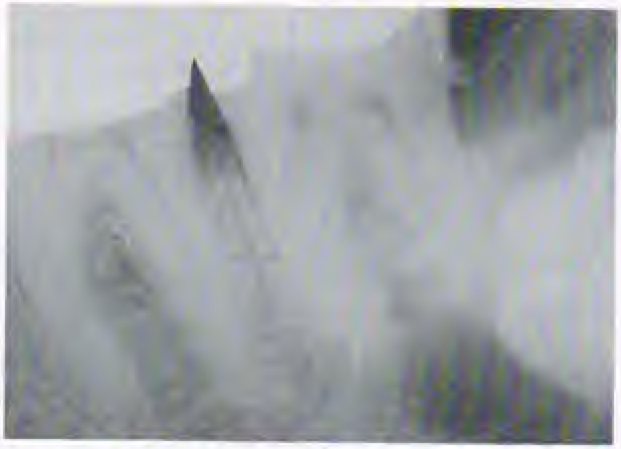
All information obtained during the patient interview should be carefully recorded.

At the completion of the patient interview, a complete examination of the structures of the head and neck (extraoral examination) and oral cavity (intraoral examination) should be performed.

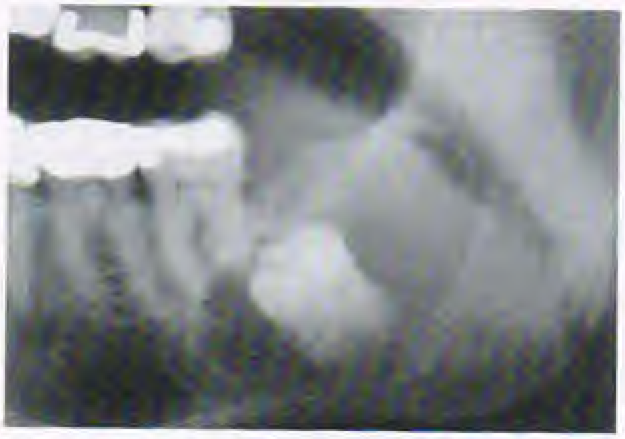
Following the extraoral and intraoral examinations, the clinician should determine if a radiographic examination is appropriate.

GENERAL PRINCIPLES OF RADIOGRAPHIC EXAMINATIONS

Appropriate radiographs must be obtained to adequately assess the area of involvement. If, for example, the entire lesion cannot be viewed on a periapical radiograph, a panographic radiograph may be indicated.



A periapical radiograph showing part of a lesion adjacent to the crown of an impacted mandibular third molar tooth. It is not possible to view the entire lesion on this radiograph.



A panographic radiograph reveals the entire lesion, which encircles the impacted third molar and extends into the ramus. The lesion was an odontogenic keratocyst.

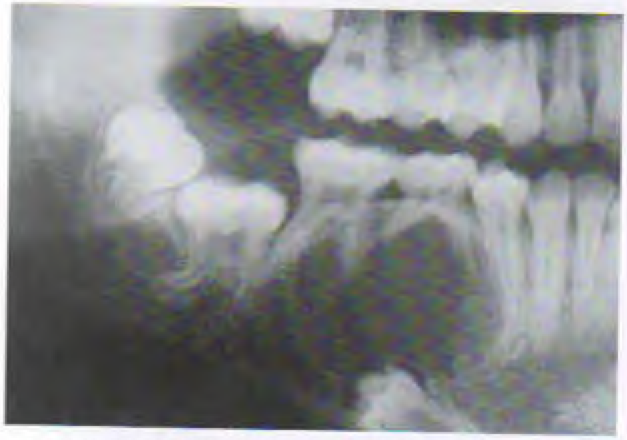
- Appropriate viewing equipment must be available including a viewbox with an intense light source and a magnifying glass.
- The radiographs must be of diagnostic quality.
- You must know the normal radiographic appearance (normal anatomic variation) of the hard tissues you are inspecting in order to assess abnormalities.
- Examine the radiograph in a systematic fashion.

COMPONENTS OF THE RADIOGRAPHIC EXAMINATION

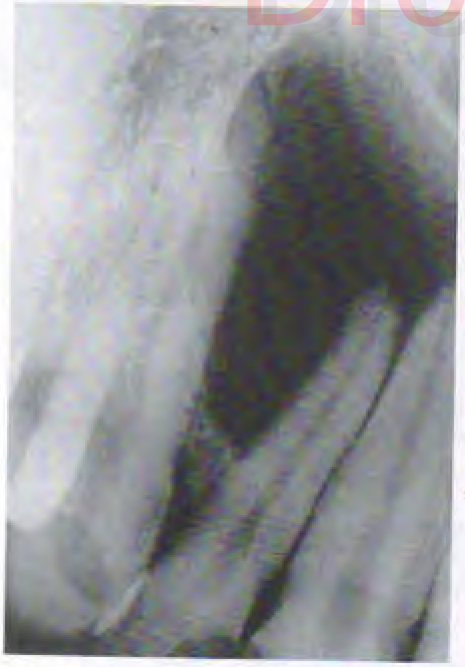
Assess the location of the lesion.

- Is the lesion in the maxilla or the mandible?
- Is the lesion in the anterior or posterior portion of the bone?
- Does the lesion cross the midline of the bone?

- Is the lesion unilateral or bilateral?
- Is the lesion focal or diffuse?
- Is the lesion associated with the root surface of the tooth?
- Is the lesion associated with the apex of a tooth (periapical)?
- Is the lesion associated with the crown of an unerupted tooth (pericoronal)?
- Is the lesion above or below the mandibular canal?



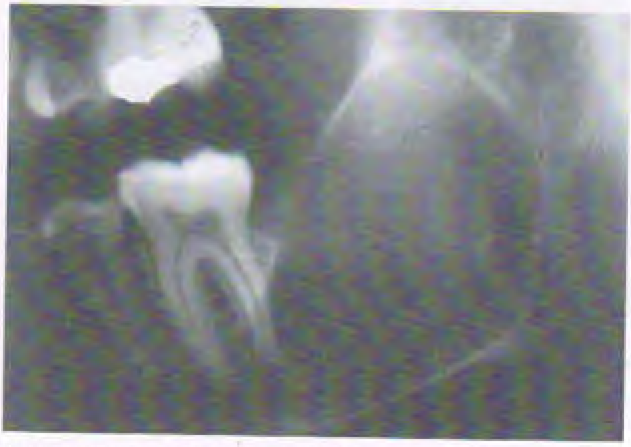
A pericoronal radiolucent lesion in the body of the mandible. The lesion was a dentigerous cyst associated with an unerupted second premolar tooth.



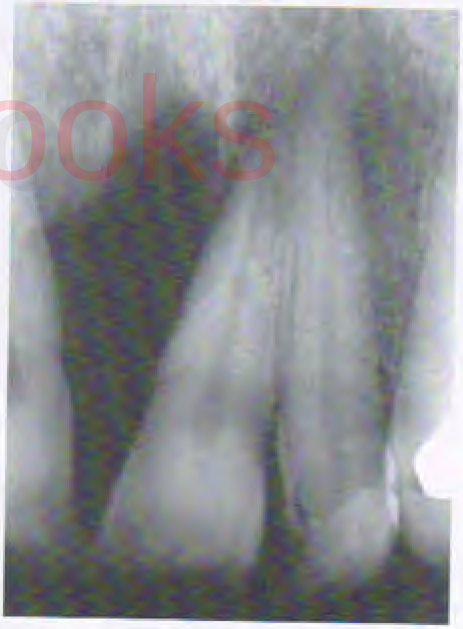
A periapical radiolucent lesion associated with a maxillary lateral incisor tooth with a necrotic pulp secondary to dental caries. The lesion was a periapical granuloma.

Assess the margins of the lesion.

- Are the margins circumscribed (defined) or poorly circumscribed (ill-defined)?
- Are the margins corticated, sclerotic, or punched-out in appearance?
- Are the margins regular, irregular, or scalloped in shape?



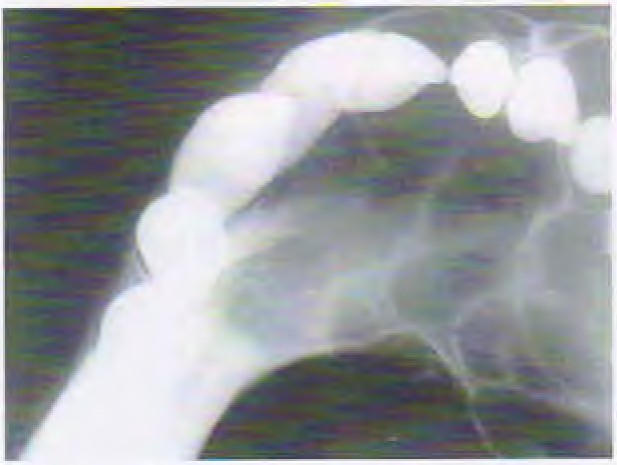
A circumscribed lesion with corticated margins in the mandibular body. The lesion was a unicystic ameloblastoma.



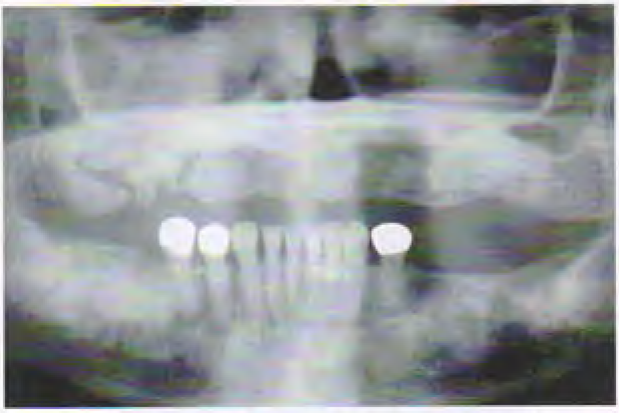
A punched-out lesion in the anterior maxilla between the roots of the central incisor teeth. The lesion was an eosinophilic granuloma.

Assess the composition of the lesion.

- Is the lesion radiolucent, radiopaque, or mixed in appearance?
- If the lesion is radiolucent, is it unilocular or multilocular? Does it exhibit a honeycomb or soap bubble pattern?
- If the lesion is radiopaque, does it exhibit a cotton wool, ground glass, or orange peel appearance?



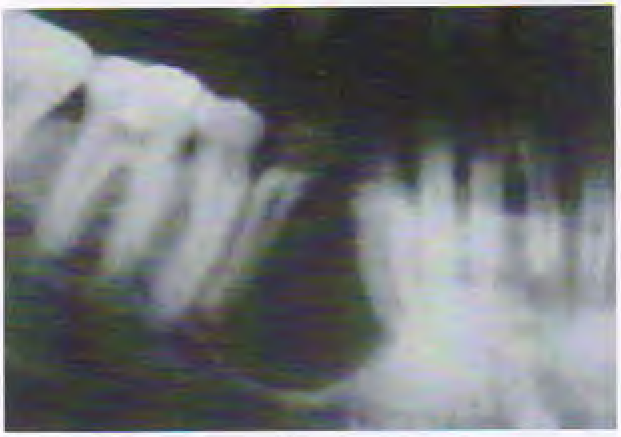
A multilocular (soap-bubble) radiolucent lesion in the anterior mandible. The lesion was an arteriovenous malformation.



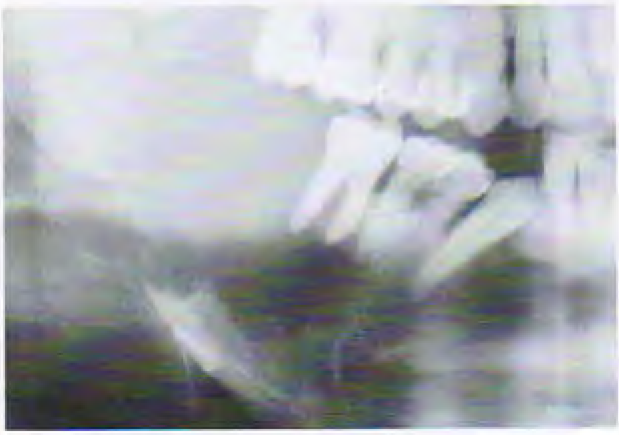
Multiple radiopague lesions in the maxilla and mandible exhibiting a cotton-wool appearance. The lesions were the result of PagetÖs disease of bone.

Assess the effect of the lesion on adjacent structures.

- Is the lesion expanding or eroding the adjacent cortical bone? If the lesion is eroding the cortex, is there evidence of pathologic fracture?
- Is the lesion invading the mandibular canal?
- Is the lesion invading the maxillary antrum?
- Is the lesion displacing teeth?
- Is the lesion eroding the roots of teeth? If erosion is present, is it regular or irregular in pattern?



A lesion in the mandible which is causing the displacement of tooth roots. The lesion was an odontogenic keratocyst.



A lesion in the posterior mandible that is eroding the adjacent cortical bone causing a pathologic fracture. The lesion was an intraosseous squamous cell carcinoma.

Assess the biologic potential of the lesion.

- Does the lesion exhibit radiographic evidence of limited growth (benign neoplasms), or of aggressive growth (malignant neoplasms)?

  Because benign neoplasms in bone are usually encapsulated and slowly expansile, they have circumscribed margins which are either corticated or sclerotic. They tend to grow around or displace (expand) adjacent anatomic structures.

  Because malignant neoplasms exhibit invasion and rapid growth, they have poorly circumscribed margins and tend to destroy (erode) adjacent anatomic structures.

COMMONLY-USED TERMS TO DESCRIBE BONY LESIONS

Abscess - A focal area of acute inflammation composed of neutrophils and necrotic debris (pus). An abscess in bone appears as a circumscribed radiolucent lesion. A periapical abscess is an example.

Circumscribed margin - The margin of an intra-osseous lesion which is distinct when viewed on a radiograph. A circumscribed margin is usually associated with a slowly expanding lesion such as a periapical cyst.

Cortical erosion - Destruction of the cortical plate caused by rapid proliferation of an intra-osseous pathologic process. Intra-osseous malignancies commonly cause cortical erosion.

Cortical expansion - Deformation of the cortical plate caused by slow expansion of an intra-osseous pathologic process. An odontogenic cyst commonly causes cortical expansion.

Corticated margin - A uniformly thin, radiopaque border composed of reactive bone usually associated with a slowly expansile lesion such as a dentigerous cyst.

Cotton wool appearance - Multiple, circumscribed, radiopaque masses against a radiolucent background giving the appearance of cotton wool (cotton balls). Paget's disease of bone shows a cotton wool appearance.

Cyst - A fluid-filled cavity lined with epithelium. A dentigerous cyst is an example.

Diffuse pattern - Multiple intra-osseous lesions which are distributed throughout the involved bone. Diffuse sclerosing osteomyelitis is an example.

Dysplasia - Not the same as epithelial dysplasia. When the term dysplasia is applied to epithelial lesions, it indicates that the lesion might be premalignant. In contrast, when applied to bony lesions, the term dysplasia simply means an abnormal pattern of development. It does not mean that the lesion is premalignant. Florid cemento-osseous dysplasia is an example.

Fistula - A pathologic communication that allows the drainage of pus from an abscess. A fistula can develop from a periapical abscess and extend through the alveolar bone to the gingival surface.

Florid pattern - Synonymous with diffuse. Multiple intra-osseous lesions which are distributed throughout the involved bone. Florid cemento-osseous dysplasia is an example.

Focal pattern - Intra-osseous lesions which are localized to a single site (focus) in an involved bone. Focal cemento-osseous dysplasia is an example.

Granuloma - A focal area of chronic inflammation composed of vascularized granulation tissue. A granuloma in bone appears as a circumscribed radiolucent lesion. A periapical granuloma is an example.

Ground glass appearance - Thin, irregular, bony trabeculae that produce a diffuse granular radiopacity. A ground glass appearance is typical of fibrous dysplasia.

Honeycomb appearance - Synonymous with multilocular appearance. The appearance of a radiolucent lesion composed of multiple small compartments. An intra-osseous hemangioma commonly exhibits a honeycomb appearance.

Mixed (radiolucent/radiopaque) lesion - An intra-osseous lesion composed of both soft and hard tissues. Some parts of the lesion allow x-rays to penetrate while other parts do not.

Moth-eaten appearance - The appearance of a lesion composed of multiple, confluent, irregular radiolucencies. A moth-eaten appearance is seen in acute osteomyelitis.

Mottled appearance - The appearance of a lesion which exhibits varying degrees of radiopacity. A mottled appearance is seen in florid osseous dysplasia.

Multilocular appearance - The appearance of a radiolucent lesion composed of multiple compartments. The odontogenic keratocyst is commonly multilocular.

Onion skin pattern - The radiographic pattern produced by thin bony trabeculae proliferating parallel to the cortical plate. Periosteal reactions associated with chronic osteomyelitis can exhibit an onion skin pattern.

Paresthesia - An abnormal sensation such as burning, tingling, or numbness associated with damage to a sensory nerve. Paresthesia localized to the lower lip is associated with damage to the mandibular nerve.

Pathologic fracture - A fracture visible on a radiograph caused by the proliferation of a pathologic process. Pathologic fractures are commonly associated with malignancies.

Periapical lesion - A lesion located at the apex of a tooth root. A periapical abscess is an example.

Pericoronal lesion - A lesion located around the crown of an unerupted tooth. A dentigerous cyst is an example.

Poorly circumscribed margin - The margin of an intra-osseous lesion which is ill-defined when viewed on a radiograph. A poorly circumscribed margin is commonly associated with a rapidly proliferating lesion such as a malignancy.

Punched-out pattern - Circumscribed radiolucent lesion that appears to be punched out of the involved bone (the margins of the lesion are not sclerotic). The intra-osseous lesions of Langerhans cell disease characteristically exhibit a punched-out appearance.

Radicular lesion - A lesion located at the apex of a tooth. A radicular cyst is an example.

Radiolucent lesion - An intra-osseous lesion composed of soft tissues that allow penetration of x-rays.

Radiopaque lesion - An intra-osseous lesion composed of hard tissues that block penetration of x-rays.

Ragged margin - The margin of an intra-osseous lesion which is indistinct. Ragged margins are often associated with rapidly growing malignancies.

Scalloped margin - The margin of an intra-osseous lesion which extends in a scalloped fashion into the inter-radicular bone between the roots of adjacent teeth. Traumatic bone cyst is an example of an intra-osseous lesion with a scalloped margin.

Sclerotic margin - A thick radiopaque border composed of reactive bone usually associated with a slowly expanding lesion such as periapical cemento-osseous dysplasia.

Sequestrum - A fragment of necrotic bone that has become separated from the adjacent viable bone. A sequestrum may be encountered in osteomyelitis.

Soap bubble appearance - Synonymous with multilocular appearance. The appearance of a radiolucent lesion composed of multiple small compartments. Intra-osseous hemangioma can exhibit a soap bubble appearance.

Sunburst (sunray) pattern - The radiographic pattern produced when thin bony trabeculae extend away from the cortical plate in a perpendicular fashion. The sunburst (sunray) pattern is commonly associated with osteogenic sarcoma.

Unilocular appearance - The appearance of a radiolucent lesion composed of a single compartment. A dentigerous cyst is an example of a unilocular lesion.

Well circumscribed (defined) margin - Synonymous with circumscribed margin. The margin of an intra-osseous lesion which is distinct when viewed on a radiograph. Slowly expansile cystic lesions commonly have well circumscribed margins.

ESTABLISHING A RADIOGRAPHIC DIFFERENTIAL DIAGNOSIS

For some lesions of the jaws, a precise diagnosis can be made based solely on patient history, clinical presentation, and radiographic appearance. No additional diagnostic procedures are necessary. However, bony lesions share similar radiographic features. For these lesions, it is necessary to formulate a radiographic differential diagnosis. A radiographic differential diagnosis is a list of diseases (usually no more than four or five) that fit the radiographic presentation of the lesion. The disease you think is the most likely diagnosis should be listed first, the next most likely listed second, and so on.

In order to determine the final diagnosis, additional diagnostic procedures may be necessary. These procedures commonly require removal of some or all of the lesion for microscopic examination. Biopsies of bony lesions are usually performed by a dental specialist. Depending on the location of the lesion, the biopsy procedure might be performed by an oral and maxillofacial surgeon, periodontist, or endodontist.

PERIAPICAL RADIOLUCENT LESIONS

GENERAL PRINCIPLES

- Lesions that appear as radiolucencies at the root apex can represent inflammatory, dysplastic, developmental, or neoplastic processes.
- Some periapical lesions are initially radiolucent, but eventually become radiopaque (these lesions are also included in the section on periapical radiopaque lesions).
- The most common periapical radiolucent lesions are the result of pulpal necrosis secondary to dental caries.
- It is important to assess the vitality of the tooth when a periapical lesion is present.
- Symptoms associated with pulpal infection indicate an inflammatory etiology.
- It is important to remember that when the term dysplasia is applied to a lesion in bone, it does not indicate premalignancy.

LIST OF DISEASES

COMMON DISEASES

Periapical Abscess 14
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UNCOMMON DISEASES

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Central Neurofibroma 22
Central Giant Cell Granuloma 23
Ameloblastoma 24
Calcifying Odontogenic Cyst 25
Cementoblastoma 26
Langerhans Cell Disease 27
Localized Aggressive Periodontitis 28

PERIAPICAL ABSCESS

SYNONYMS

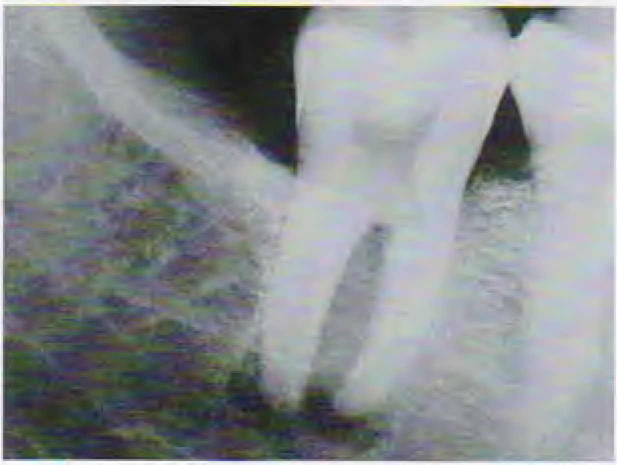
- Apical periodontal abscess

ETIOLOGY

- An acute inflammatory process containing neutrophils and necrotic debris (pus).
- Develops at the root apex of a tooth with pulpal necrosis usually secondary to dental caries.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiolucent lesion at the root apex.
- The lesion may occasionally be displaced laterally.
- The tooth may show deep caries, a large restoration, or evidence of previous endodontic therapy.



A periapical abscess. The tooth had a coronal fracture.

OTHER USEFUL CLINICAL INFORMATION

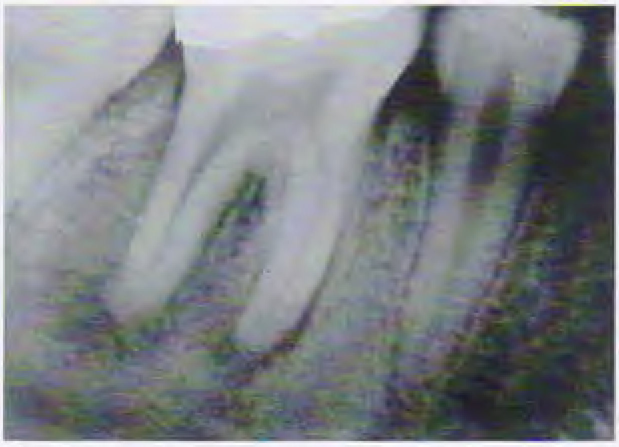
- The tooth will be nonvital.
- The tooth will be painful to percussion.
- A parulis may be present on the adjacent gingiva.

DIFFERENTIAL DIAGNOSIS

- Periapical granuloma
- Periapical cyst
- Focal sclerosing osteomyelitis
- Periapical cemento-osseous dysplasia

DIAGNOSTIC STEPS

- Percuss the tooth (it should be painful to percussion).
- Test the vitality of the pulp (it should be nonvital).
- Make endodontic access into the pulp chamber (the pulp should be necrotic).
- Microscopic examination of the periapical tissue is necessary to confirm the diagnosis.



A periapical abscess. The tooth had recurrent caries under an amalgam restoration.

TREATMENT RECOMMENDATIONS

- Endodontic therapy if the tooth is restorable.
- Extraction if the tooth is not restorable.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- If untreated, a periapical abscess can develop into osteomyelitis, septicemia, Ludwig's angina, or cavernous sinus thrombosis.

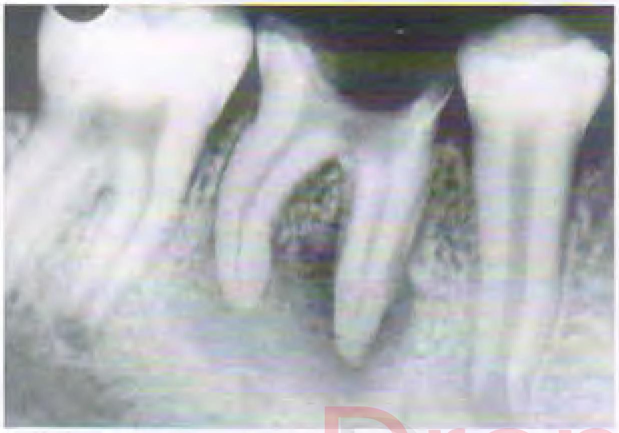
PERIAPICAL GRANULOMA

SYNONYMS

- Chronic apical periodontitis

ETIOLOGY

- A circumscribed radiolucent lesion at the root apex.
- The lesion may occasionally be displaced laterally.
- The tooth may show deep caries, a large restoration, or evidence of previous endodontic therapy.



A periapical granuloma. The tooth had a large carious lesion.

OTHER USEFUL CLINICAL INFORMATION

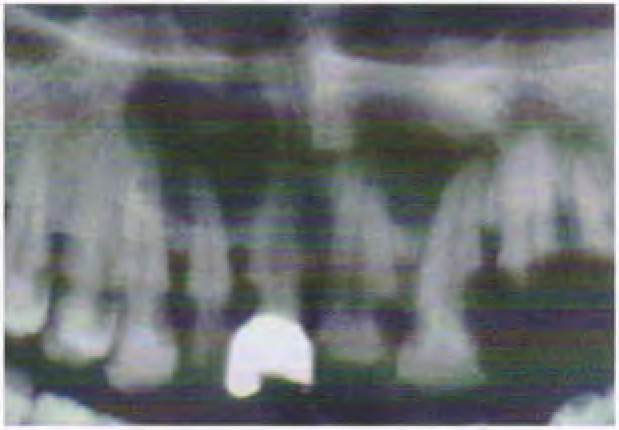
- The tooth will be nonvital.
- The tooth will not be painful to percussion.

DIFFERENTIAL DIAGNOSIS

- Periapical abscess
- Periapical cyst
- Focal sclerosing osteomyelitis
- Periapical cemento-osseous dysplasia
- Simple bone cyst

DIAGNOSTIC STEPS

- Percuss the tooth (it should not be painful to percussion).
- Test the vitality of the pulp (it should be nonvital).
- Make endodontic access into the pulp chamber (the pulp should be necrotic).
- Microscopic examination of the periapical tissue is necessary to confirm the diagnosis.



Periapical granulomas. The patient had extensive caries secondary to chronic dry mouth.

TREATMENT RECOMMENDATIONS

- Endodontic therapy if the tooth is restorable.
- Extraction if the tooth is not restorable.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- A periapical granuloma can undergo acute exacerbation to form a periapical abscess.

PERIAPICAL CYST

SYNONYMS

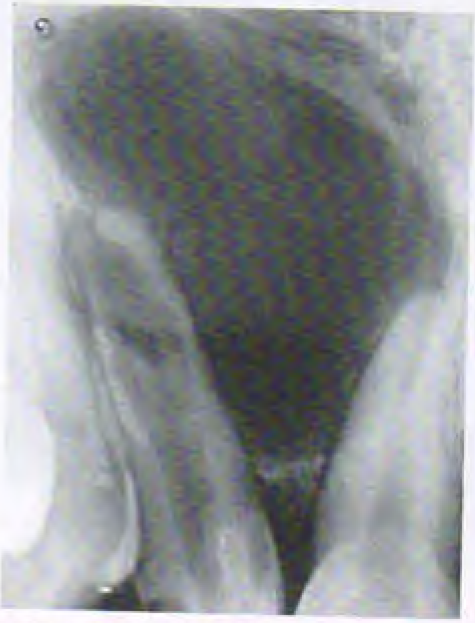
- Radicular cyst

ETIOLOGY

- Proliferation of odontogenic epithelium in a pre-existing periapical granuloma.
- The odontogenic epithelium originates from the rest of Malassez.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiolucent lesion at the root apex.
- The lesion may occasionally be displaced laterally.
- The tooth may show deep caries, a large restoration, or evidence of previous endodontic therapy.



A periapical cyst. The tooth had been displaced by a traumatic injury and showed evidence of internal root resorption.

OTHER USEFUL CLINICAL INFORMATION

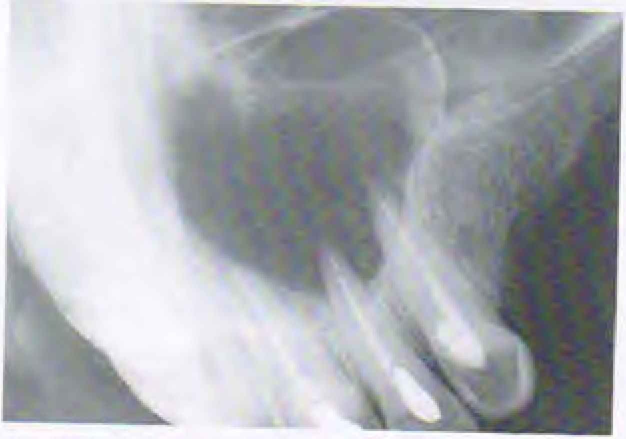
- The tooth will be nonvital.
- The tooth will not be painful to percussion.

DIFFERENTIAL DIAGNOSIS

- Periapical abscess
- Periapical granuloma
- Focal sclerosing osteomyelitis
- Periapical cemento-osseous dysplasia
- Simple bone cyst

DIAGNOSTIC STEPS

- Percuss the tooth (it should not be sensitive to percussion).
- Test the vitality of the pulp (it should be nonvital).
- Make endodontic access into the pulp chamber (the pulp should be necrotic).
- Microscopic examination of the periapical tissue is necessary to confirm the diagnosis.



A periapical cyst. The teeth had been displaced by a traumatic injury and treated with conventional endodontic therapy.

TREATMENT RECOMMENDATIONS

- Endodontic therapy if the tooth is restorable.
- Extraction if the tooth is not restorable.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- In rare instances, squamous cell carcinoma has been reported to arise from the epithelial lining of a periapical cyst.

EXTERNAL ROOT RESORPTION

SYNONYMS

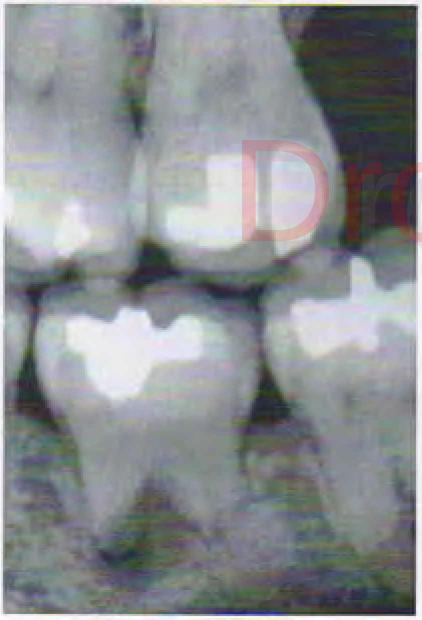
- Idiopathic external resorption

ETIOLOGY

- Multiple etiologic factors including trauma, orthodontic therapy, pressure from an impacted tooth, tooth reimplantation, and expansion of a cyst or tumor.
- When there is no apparent cause for the resorption, the term *idiopathic external resorption* is commonly used.

TYPICAL RADIOGRAPHIC FEATURES

- Irregular destruction of the root apex with an ill-defined area of periapical radiolucency.



External resorption of the roots of a mandibular molar tooth. The tooth was asymptomatic.

OTHER USEFUL CLINICAL INFORMATION

- The tooth will usually be vital.
- The tooth may be sensitive to percussion.
- The process is typically discovered on routine dental radiographs.

DIFFERENTIAL DIAGNOSIS

- Because of its distinctive location and radiographic features, external root resorption is infrequently confused with other periapical radiolucent lesions.

TREATMENT RECOMMENDATIONS

- Endodontic therapy can be attempted, but, unfortunately, the resorption usually continues until the tooth is ultimately lost.

FOCAL SCLEROSING OSTEOMYELITIS

SYNONYMS

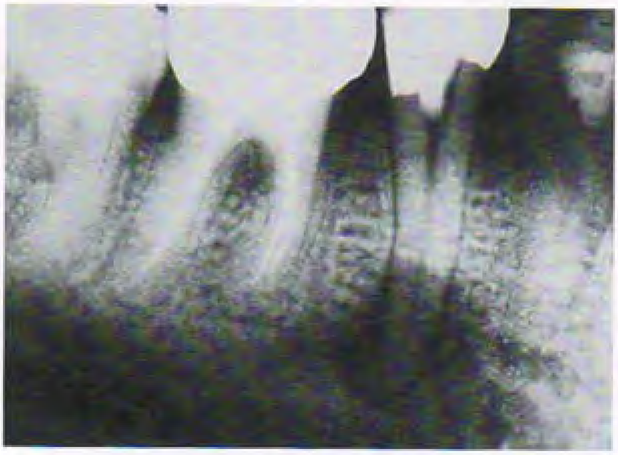
- Focal chronic sclerosing osteomyelitis
- Condensing osteitis

ETIOLOGY

- Chronic osteomyelitis that develops at the root apex of a tooth with chronic pulpitis secondary to deep caries.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiolucent lesion at the root apex of a tooth with a deep carious lesion.



Focal sclerosing osteomyelitis. The tooth had a large amalgam restoration and recurrent caries.

OTHER USEFUL CLINICAL INFORMATION

- A mandibular premolar or molar tooth is the most frequently involved.
- The tooth may be asymptomatic, or there may be chronic pain of low intensity.
- The tooth is usually not sensitive to percussion.
- The pulp is usually nonvital.

DIFFERENTIAL DIAGNOSIS

- Periapical abscess
- Periapical granuloma
- Periapical cyst

DIAGNOSTIC STEPS

- Percuss the tooth (it should not be sensitive to percussion).
- Test the vitality of the pulp (it usually tests nonvital).
- Microscopic examination of periapical tissue is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Endodontic therapy if the tooth is restorable.
- Extraction if the tooth is not restorable.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- With time, this lesion will become calcified and appear as a periapical radiopaque lesion.

PERIAPICAL CEMENTO-OSSEOUS DYSPLASIA

SYNONYMS

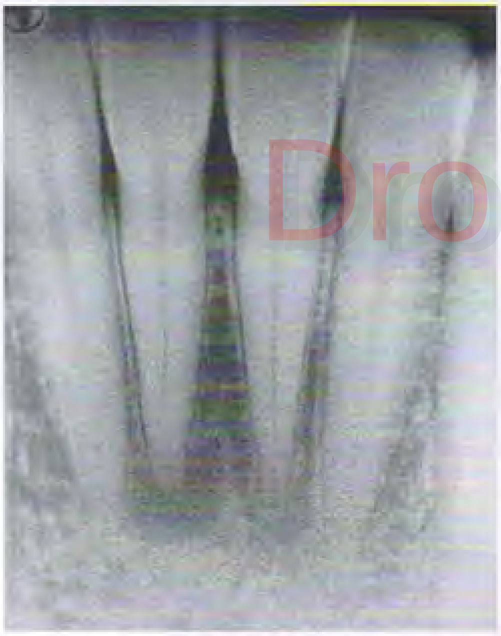
- Cemental dysplasia
- Cementoma

ETIOLOGY

- A reactive proliferation in response to unknown factors.

TYPICAL RADIOGRAPHIC FEATURES

- Early lesions present as circumscribed radiolucencies at the ends of the roots of multiple mandibular anterior teeth.
- The teeth involved are usually free of caries or restorations.



Early lesions of periapical cemento-osseous dysplasia. The teeth were asymptomatic and vital.

OTHER USEFUL CLINICAL INFORMATION

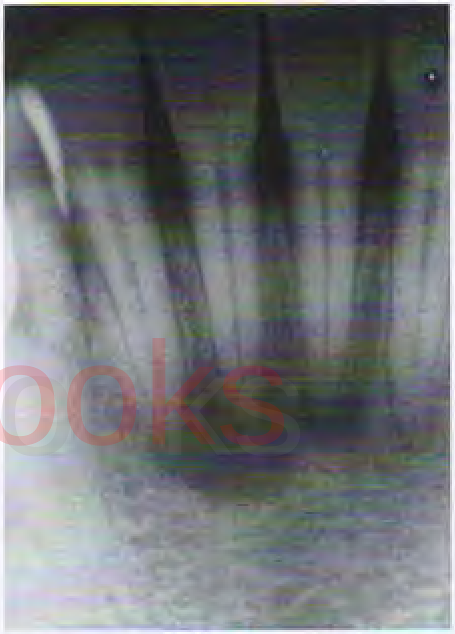
- The lesions are asymptomatic.
- They are usually discovered on routine dental radiographs.
- More common in middle-aged African-American females.

DIFFERENTIAL DIAGNOSIS

- Periapical abscess
- Periapical granuloma
- Periapical cyst
- Focal sclerosing osteomyelitis

DIAGNOSTIC STEPS

- Percuss the teeth (they will not be painful to percussion).
- Test the vitality of the teeth (they will test vital).



Early lesions of periapical cemento-osseous dysplasia. The teeth were asymptomatic and vital.

TREATMENT RECOMMENDATIONS

- No treatment necessary

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- With time, calcified material (bone and cementum) will be deposited within the lesions and they will appear radiopaque.
- May be associated with florid cemento-osseous dysplasia.
- The use of the term dysplasia does not mean that these lesions are premalignant.

SIMPLE BONE CYST

SYNONYMS

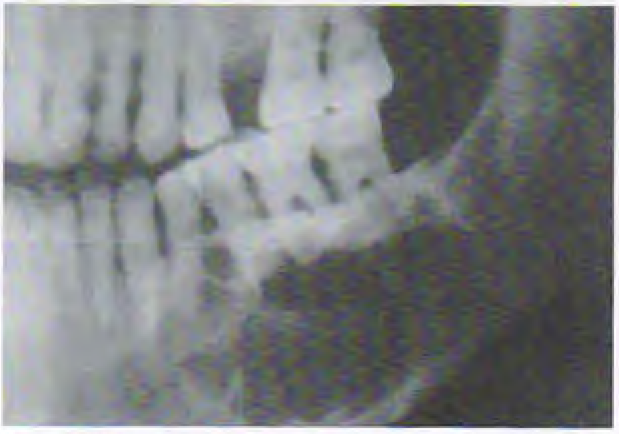
- Traumatic bone cyst
- Hemorrhagic bone cyst
- Idiopathic bone cavity

ETIOLOGY

- The precise etiology is unknown.
- May represent defective bone healing following a traumatic injury.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed solitary radiolucent lesion.
- Typically extends between the roots of teeth resulting in a scalloped appearance.
- More common in the premolar/molar area of the mandible.



A simple bone cyst in the posterior mandible. The teeth were asymptomatic and vital.

OTHER USEFUL CLINICAL INFORMATION

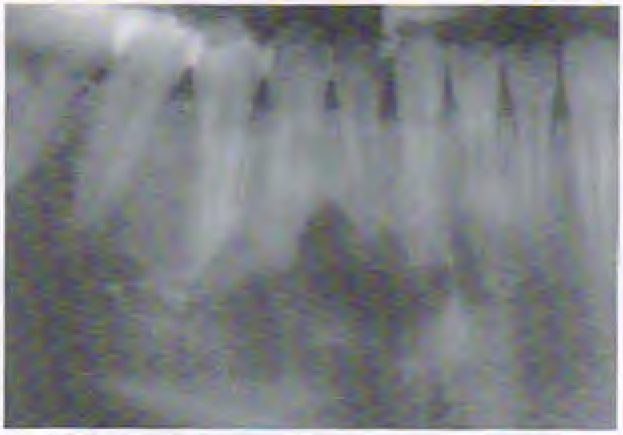
- More common in young adults.
- The teeth adjacent to the lesion are vital.
- The lesion is usually asymptomatic and discovered on routine dental radiographs.
- May cause cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Periapical granuloma
- Periapical cyst
- Central giant cell granuloma
- Odontogenic neoplasms

DIAGNOSTIC STEPS

- Percuss the teeth (they should not be painful to percussion).
- Test the vitality of the teeth (they should test vital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A simple bone cyst in the anterior mandible. The teeth were asymptomatic and vital.

TREATMENT RECOMMENDATIONS

- Aspiration to rule out a vascular lesion.
- Surgical exploration with curettage of the lesion walls.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- May be associated with florid cemento-osseous dysplasia.

CENTRAL NEUROFIBROMA

SYNONYMS

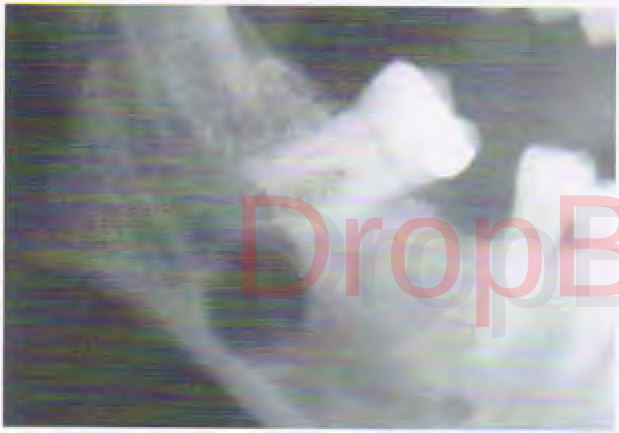
- Central neurogenic tumor
- Central nerve sheath tumor

ETIOLOGY

- A benign neoplasm of nerve sheath (neurofibroblast) origin.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiolucent lesion centered on the mandibular canal.
- May cause erosion of adjacent tooth roots.



A central neurofibroma arising from the inferior alveolar (mandibular) nerve. The tooth was asymptomatic and vital.

OTHER USEFUL CLINICAL INFORMATION

- The teeth adjacent to the lesion are asymptomatic and vital.
- May be associated with cortical expansion.
- May be associated with paresthesia of the lower lip.

DIFFERENTIAL DIAGNOSIS

- Periapical granuloma
- Periapical cyst
- Simple bone cyst

DIAGNOSTIC STEPS

- Percuss the teeth (they should not be painful to percussion).
- Test the vitality of the teeth (they should test vital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical excision

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- May be a component of neurofibromatosis (Von Recklinghausen's disease).

CENTRAL GIANT CELL GRANULOMA

SYNONYMS

- Central giant cell lesion
- Central giant cell tumor

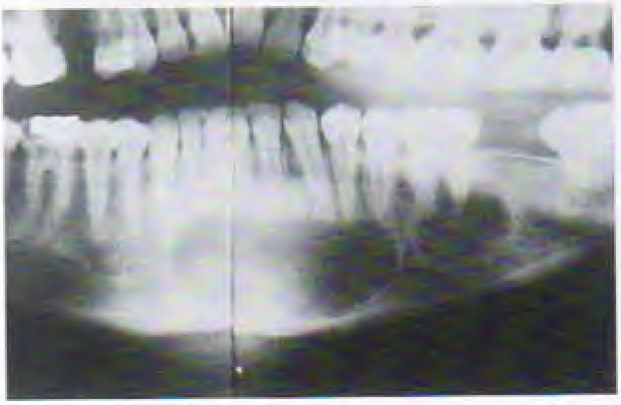
ETIOLOGY

A reactive granulomatous proliferation containing multinucleated giant cells (generally thought to be osteoclasts).

- May represent a reparative response to inflammation within the bone.

TYPICAL RADIOGRAPHIC FEATURES

- A unilocular or multilocular radiolucent lesion with circumscribed or indistinct margins.
- Commonly located in the anterior mandible.
- Can cross the midline.
- May cause resorption of adjacent tooth roots.



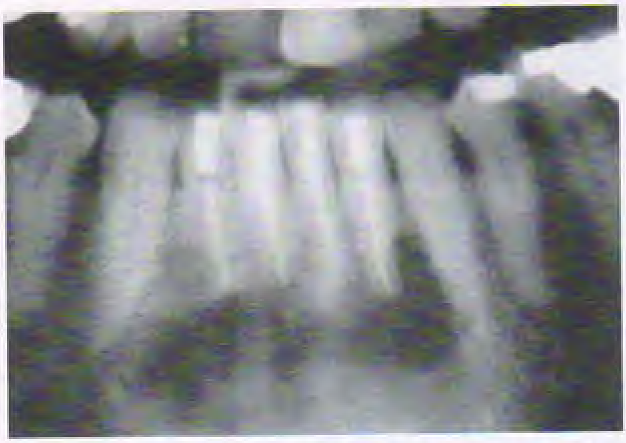
A central giant cell granuloma in the mandible. The lesion crossed the midline.

OTHER USEFUL CLINICAL INFORMATION

- More common in young adults.
- The teeth adjacent to the lesion are asymptomatic and vital.
- There may be cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Periapical granuloma
- Periapical cyst
- Simple bone cyst



A central giant cell granuloma in the midline of the anterior mandible. The lesion was initially thought to be of endodontic origin.

DIAGNOSTIC STEPS

- Percuss the teeth (they should not be painful to percussion).
- Test the vitality of the teeth (they should test vital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Curettage is the treatment of choice for smaller lesions.
- Surgical excision may be necessary for larger lesions.
- Intralesional corticosteroid injections have been proposed as an alternative to surgical therapy.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- May be associated with aneurysmal bone cyst.
- May occasionally behave in a more aggressive fashion (central giant cell tumor).
- Microscopically identical to the "brown tumor" of hyperparathyroidism.

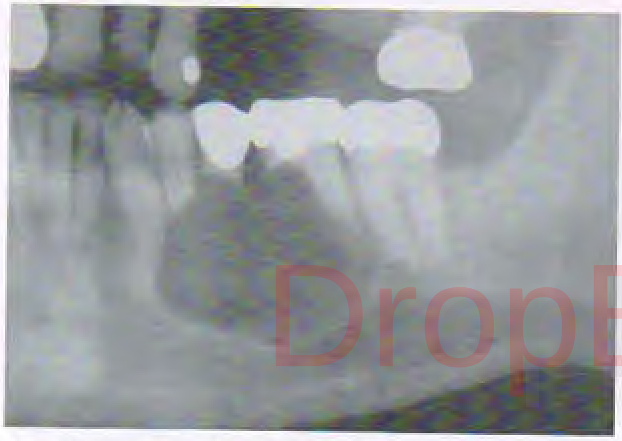
AMELOBLASTOMA

ETIOLOGY

- A benign odontogenic neoplasm that can develop from remnants of the dental lamina (rests of Serres), Hertwig's root sheath (rests of Malassez), reduced enamel epithelium lining the dental follicle, or basal cells of surface epithelium.
- Periapical lesions probably arise from rests of Malassez.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular or multilocular radiolucent lesion.
- May be associated with erosion or divergence of the roots of adjacent teeth.



An ameloblastoma in the mandible. The lesion caused erosion of the adjacent tooth roots.

OTHER USEFUL CLINICAL INFORMATION

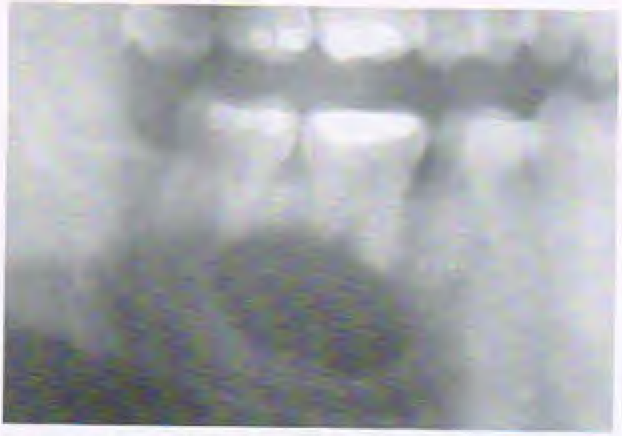
- More common in young adults.
- More common in the mandible.
- The teeth adjacent to the lesion are asymptomatic and vital.
- May exhibit cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Periapical granuloma
- Periapical cyst
- Simple bone cyst
- Central giant cell granuloma
- Calcifying odontogenic cyst

DIAGNOSTIC STEPS

- Percuss the teeth (they should not be painful to percussion).
- Test the vitality of the teeth (they should test vital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.



An ameloblastoma in the mandible. The lesion caused erosion of the adjacent tooth roots.

TREATMENT RECOMMENDATIONS

- Surgical excision is the treatment of choice.

FOLLOW-UP

- Because of the recurrent potential of the lesion, close follow-up is essential.

CLINICAL SIGNIFICANCE

- These lesions are locally aggressive and have a high rate of recurrence.
- Ameloblastomas occasionally metastasize.

CALCIFYING ODONTOGENIC CYST

SYNONYMS

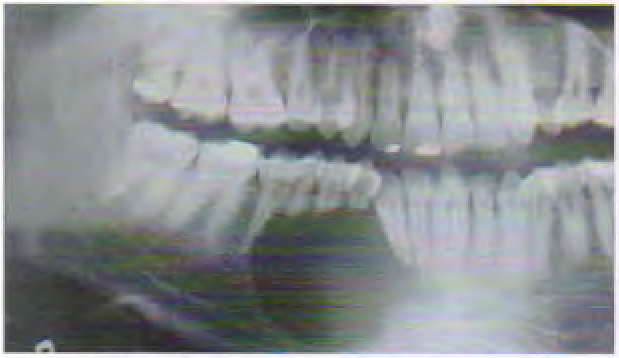
- Gorlin cyst

ETIOLOGY

- A developmental cyst that originates from tooth-forming epithelium.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular radiolucent lesion.
- May be associated with erosion of the roots of adjacent teeth.



A calcifying odontogenic cyst in the mandible. The lesion caused erosion of the adjacent tooth roots.

OTHER USEFUL CLINICAL INFORMATION

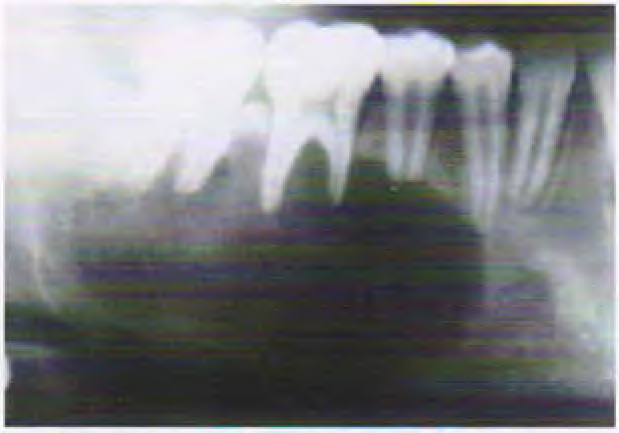
- More common in adults.
- More common in the mandibular premolar area.
- The teeth adjacent to the lesion are asymptomatic and vital.

DIFFERENTIAL DIAGNOSIS

- Periapical granuloma
- Periapical cyst
- Simple bone cyst
- Giant cell granuloma
- Ameloblastoma

DIAGNOSTIC STEPS

- Percuss the teeth (they should not be sensitive to percussion).
- Test the vitality of the teeth (they should test vital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A calcifying odontogenic cyst in the mandible. The lesion caused erosion of the adjacent tooth roots.

TREATMENT RECOMMENDATIONS

- Enucleation

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Calcifications can develop in the cyst lining causing the lesion to eventually appear radiopaque.

CEMENTOBLASTOMA

SYNONYMS

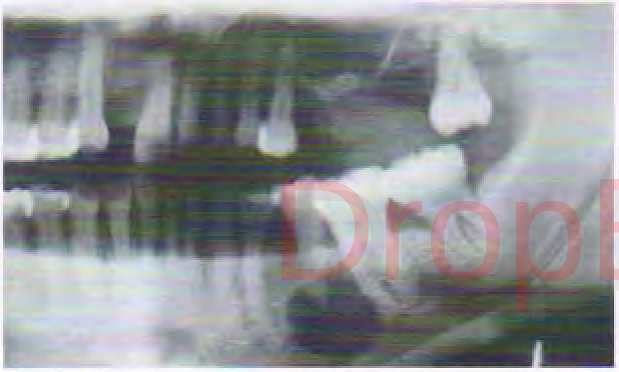
- Benign cementoblastoma
- True cementoma

ETIOLOGY

- A benign neoplasm of cementoblasts that develops at the root apex.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiolucent lesion that extends up the tooth root.
- Most often involves a mandibular molar tooth.



An early cementoblastoma. The tooth was asymptomatic and vital.

OTHER USEFUL CLINICAL INFORMATION

- More common in young adults.
- The involved tooth is asymptomatic and vital.
- May cause cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Periapical granuloma
- Periapical cyst
- Focal sclerosing osteomyelitis
- Central giant cell granuloma
- Ameloblastoma
- Calcifying odontogenic cyst

DIAGNOSTIC STEPS

- Percuss the involved tooth (it should not be painful to percussion, but may exhibit a dull sound).
- Test the vitality of the involved tooth (it should test vital).
- Microscopic examination of the lesion is necessary for definitive diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical excision

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- With time, calcifications develop within the lesion causing it to appear radiopaque.

LANGERHANS CELL DISEASE

SYNONYMS

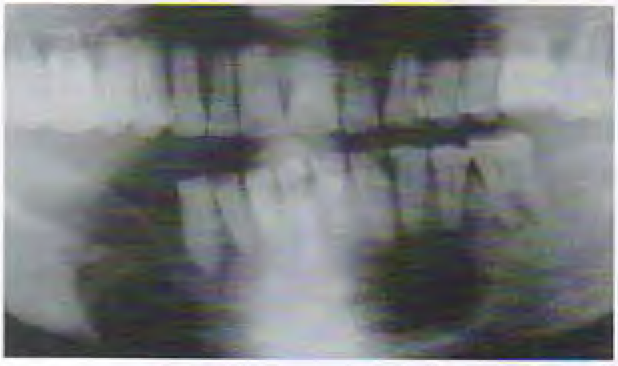
- Histiocytosis X
- Eosinophilic granuloma

ETIOLOGY

- A neoplastic proliferation of Langerhans cells (histiocytes).
- The disease can present in chronic focal, chronic disseminated, and acute disseminated forms.

TYPICAL RADIOGRAPHIC FEATURES

- A solitary punched-out radiolucent lesion around the roots of teeth.
- May involve multiple teeth.



Langerhan's cell disease (eosinophilic granuloma) in the mandible.

OTHER USEFUL CLINICAL INFORMATION

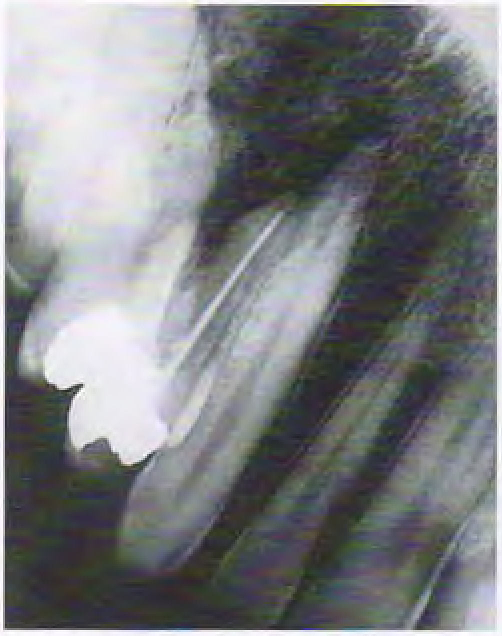
- More common in children and young adults.
- Involved teeth are usually asymptomatic and vital.
- Involved teeth are commonly mobile.

DIFFERENTIAL DIAGNOSIS

- Periapical granuloma
- Periapical cyst
- Simple bone cyst
- Ameloblastoma
- Calcifying odontogenic cyst

DIAGNOSTIC STEPS

- Percuss the teeth (they should not be painful to percussion).
- Test the vitality of the teeth (they should test vital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Langerhan's cell disease (eosinophilic granuloma) in the maxilla. The lesion was initially thought to be of endodontic origin.

TREATMENT RECOMMENDATIONS

- Surgical excision is the treatment of choice for localized lesions.
- Chemotherapy is necessary for disseminated tissue.

FOLLOW-UP

- Long-term follow-up is essential.

CLINICAL SIGNIFICANCE

- The acute disseminated form of the disease is often rapidly fatal.

LOCALIZED AGGRESSIVE PERIODONTITIS

SYNONYMS

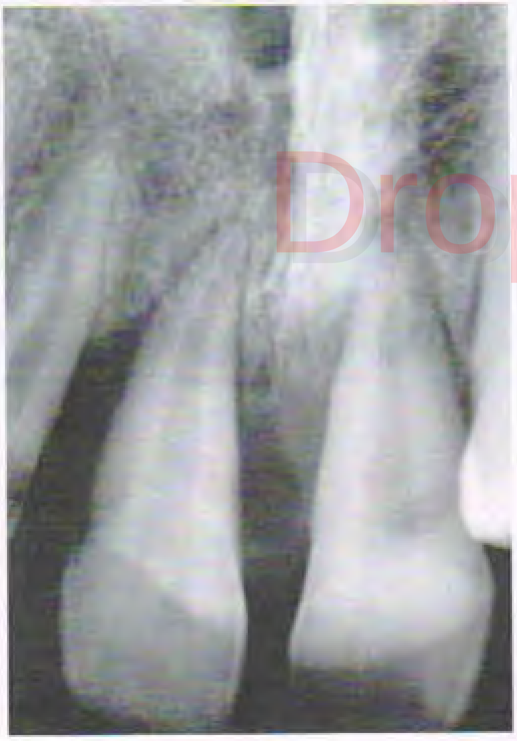
- Early-onset periodontitis

ETIOLOGY

- Genetic predisposition.
- Leukocyte (neutrophil) dysfunction without systemic manifestations.
- Specific bacterial flora (*A. actinomycetemcomitans*).
- Characterized by rapid alveolar bone loss.

TYPICAL RADIOGRAPHIC FEATURES

- Alveolar bone loss localized to the first molar and incisor teeth.



Alveolar bone loss around the maxillary central incisor tooth in a 12-year-old female with localized aggressive periodontitis.

OTHER USEFUL CLINICAL INFORMATION

- Typically exhibits a familial pattern.
- Usually develops before the age of 13 years.
- Minimal gingival inflammation.

DIFFERENTIAL DIAGNOSIS

- Because of its distinctive location and radiographic features, localized aggressive periodontitis is infrequently confused with other periapical radiolucent lesions.

TREATMENT RECOMMENDATIONS

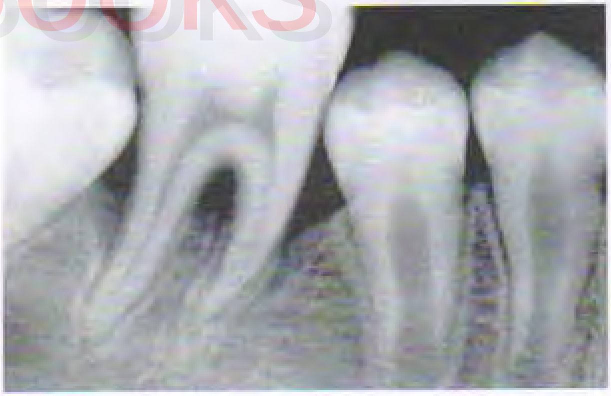
- Surgical therapy.
- Systemic antibiotic therapy.
- Antibacterial mouth rinses.

FOLLOW-UP

- Close follow-up is essential.

CLINICAL SIGNIFICANCE

- May be associated with systemic manifestations of immunologic dysfunction.



Alveolar bone loss around the first mandibular molar tooth in a 12-year-old female with localized aggressive periodontitis.

PERICORONAL RADIOLUCENT LESIONS

GENERAL PRINCIPLES

- Lesions that appear as radiolucencies around the crown of an unerupted tooth are either development cysts or neoplasms that originate from tooth-forming epithelium.
- Some pericoronal lesions are initially radiolucent, but eventually become radiopaque (these lesions are also included in the section on pericoronal radiopaque lesions).
- The most common pericoronal radiolucent lesions are dentigerous cysts.
- Pericoronal lesions develop most often around unerupted mandibular third molar teeth.
- Pericoronal radiolucent lesions commonly displace the unerupted tooth around which they develop.

LIST OF DISEASES

COMMON DISEASES

Dentigerous Cyst 30
Odontogenic Keratocyst 31
Ameloblastoma 32
Ameloblastic Fibroma 33

UNCOMMON DISEASES

Adenomatoid Odontogenic Tumor 34
Calcifying Odontogenic Cyst 35
Calcifying Epithelial Odontogenic Tumor 36

DENTIGEROUS CYST

SYNONYMS

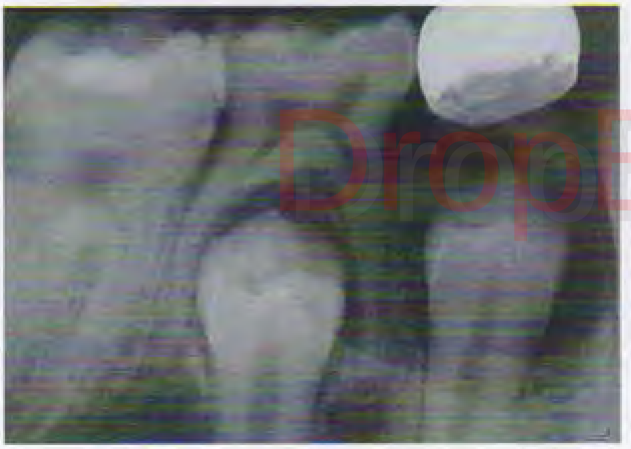
- Follicular cyst

ETIOLOGY

- An odontogenic cyst that originates from the reduced enamel epithelium of the dental follicle around the crown of an unerupted tooth.
- Fluid accumulates in the space between the crown of the tooth and the dental follicle producing an epithelial-lined cavity.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular radiolucent lesion with corticated margins encircling the crown of an impacted tooth.
- The involved tooth may be displaced by the lesion.



An early dentigerous cyst associated with an unerupted mandibular premolar tooth.

OTHER USEFUL CLINICAL INFORMATION

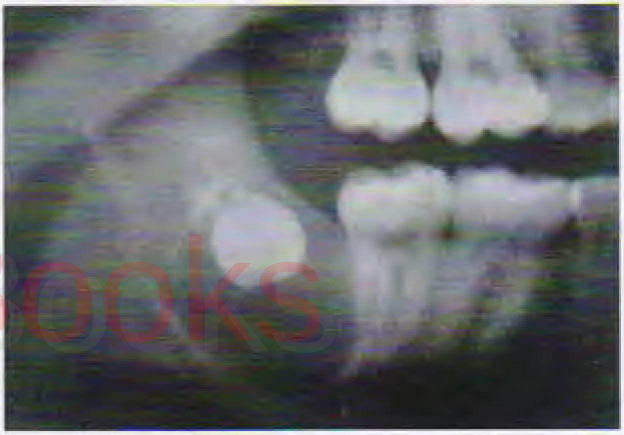
- More common in young adults.
- Mandibular third molars are the most commonly involved followed by maxillary third molars and cuspids.
- May be associated with cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Odontogenic keratocyst
- Ameloblastoma
- Ameloblastic fibroma
- Adenomatoid odontogenic tumor
- Calcifying odontogenic cyst

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A dentigerous cyst associated with an unerupted mandibular third molar tooth.

TREATMENT RECOMMENDATIONS

- Surgical enucleation and extraction of the unerupted tooth.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- The epithelial lining of a dentigerous cyst may rarely give rise to an odontogenic keratocyst, ameloblastoma, mucoepidermoid carcinoma, or squamous cell carcinoma.

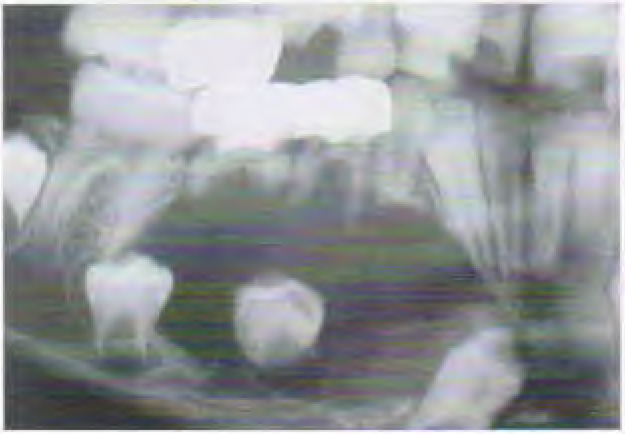
ODONTOGENIC KERATOCYST

ETIOLOGY

- An odontogenic cyst that typically originates from embryologic remnants of the dental lamina.
- It may also develop from the lining of a dentigerous cyst.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular or multilocular radiolucent lesion with corticated margins.
- The lesion develops most often around an unerupted mandibular molar.
- It commonly displaces the unerupted tooth around which it develops.



An odontogenic keratocyst associated with an unerupted mandibular premolar tooth.

OTHER SIGNIFICANT CLINICAL INFORMATION

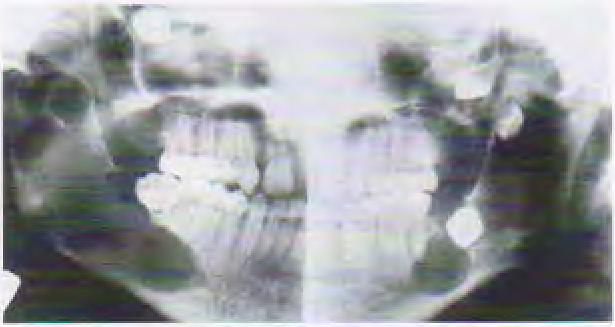
- More common in adults.
- Often causes cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Dentigerous cyst
- Ameloblastoma
- Ameloblastic fibroma
- Adenomatoid odontogenic tumor
- Calcifying odontogenic cyst

DIAGNOSTIC STEPS

- Microscopic examination of the lesions is necessary to confirm the diagnosis.



Multiple odontogenic keratocysts in a patient with nevoid basal cell carcinoma syndrome.

TREATMENT RECOMMENDATIONS

- Surgical enucleation is the treatment of choice for smaller lesions.
- More extensive surgical resection is necessary for larger lesions.

FOLLOW-UP

- Because of the recurrent potential of the lesion, close follow-up is essential.

CLINICAL SIGNIFICANCE

- An odontogenic keratocyst behaves more like a benign neoplasm than a developmental cyst (more than 30% of the lesions recur following surgical excision).
- Multiple odontogenic keratocysts are a feature of nevoid basal cell carcinoma syndrome (other components of the syndrome include bifid ribs and basal cell carcinomas).

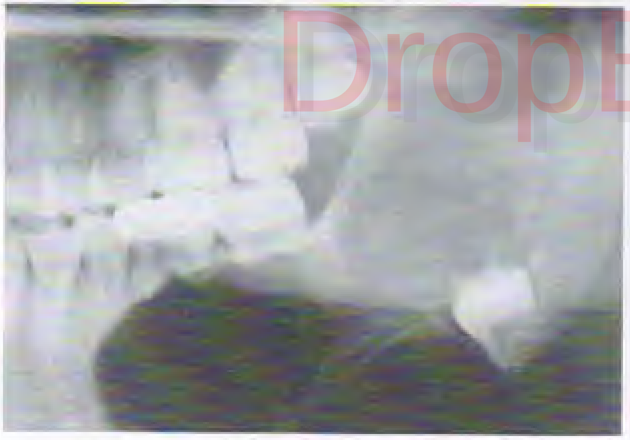
AMELOBLASTOMA

ETIOLOGY

- A benign odontogenic neoplasm that can develop from remnants of the dental lamina (rests of Serres), Hertwig's root sheath (rests of Malassez), reduced enamel epithelium lining the dental follicle, or basal cells of surface epithelium.
- Pericoronal lesions arise from reduced enamel epithelium that lines the dental follicle around an unerupted tooth.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular or multilocular radiolucent lesion with a corticated margin.
- The lesion may exhibit a soap-bubble appearance.
- Develops most often around the crown of an unerupted mandibular third molar tooth.
- Commonly displaces the tooth inferiorly.
- Often extends into the ramus.
- May cause resorption of the roots of adjacent teeth.



A multilocular ameloblastoma associated with an unerupted mandibular third molar tooth. The lesion caused erosion of the roots of adjacent teeth.

OTHER USEFUL CLINICAL INFORMATION

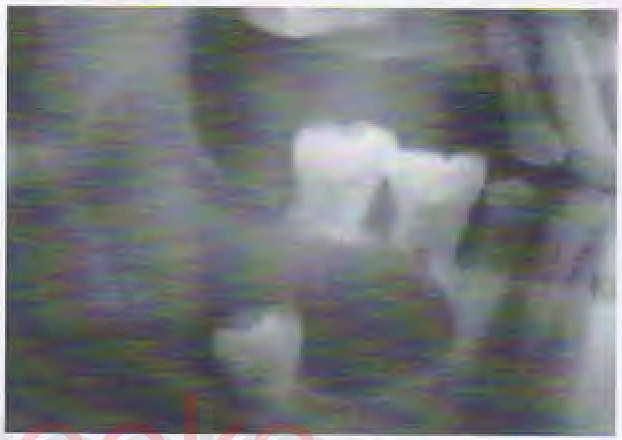
- More common in young and middle-aged adults.
- Commonly causes cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Dentigerous cyst
- Odontogenic keratocyst
- Ameloblastic fibroma
- Adenomatoid odontogenic tumor
- Calcifying odontogenic cyst

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A unilocular ameloblastoma associated with an unerupted mandibular third molar tooth. The lesion caused erosion of the roots of adjacent teeth.

TREATMENT RECOMMENDATIONS

- Wide surgical resection is the treatment of choice.

FOLLOW-UP

- Because of the recurrent potential of the lesion, close follow-up is essential.

CLINICAL SIGNIFICANCE

- These lesions are locally aggressive and have a high rate of recurrence.
- Ameloblastomas occasionally metastasize.
- Unicystic ameloblastoma is a variant of this neoplasm that typically appears as a circumscribed unilocular radiolucent lesion around an unerupted mandibular third molar tooth. In some cases, unicystic ameloblastomas are less aggressive and can be successfully treated with surgical enucleation.

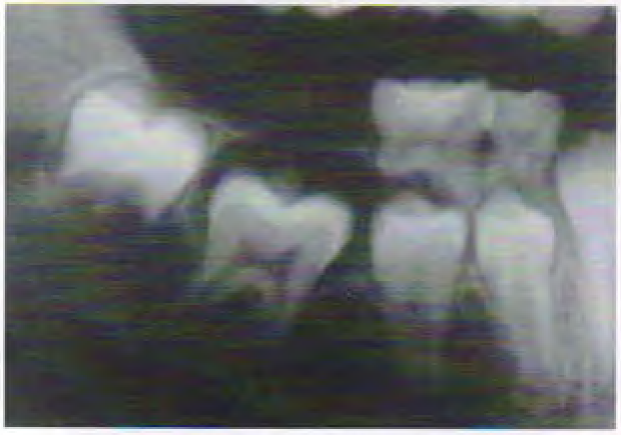
AMELOBLASTIC FIBROMA

ETIOLOGY

- A benign neoplasm of tooth-forming epithelium.
- Resembles the bell stage of normal tooth development.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular or multilocular radiolucent lesion with corticated margins.
- More than 90% develop around the crown of an unerupted tooth, usually a mandibular molar.



An ameloblastic fibroma associated with an unerupted mandibular first molar tooth.

OTHER USEFUL CLINICAL INFORMATION

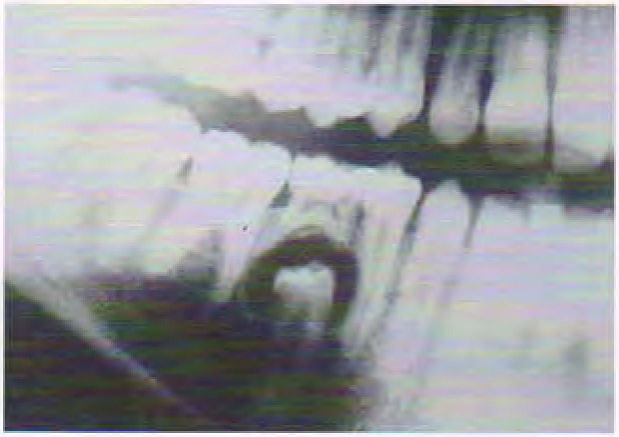
- More common in children.
- Occasionally associated with cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Dentigerous cyst
- Odontogenic keratocyst
- Ameloblastoma
- Adenomatoid odontogenic tumor
- Calcifying odontogenic cyst

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



An ameloblastic fibroma associated with an unerupted mandibular premolar tooth.

TREATMENT RECOMMENDATIONS

- Surgical enucleation with extraction of the unerupted tooth is the treatment of choice.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- This neoplasm is much less likely to recur than an ameloblastoma.
- There is a rare malignant counterpart of this lesion called an ameloblastic fibrosarcoma.

ADENOMATOID ODONTOGENIC TUMOR

SYNONYMS

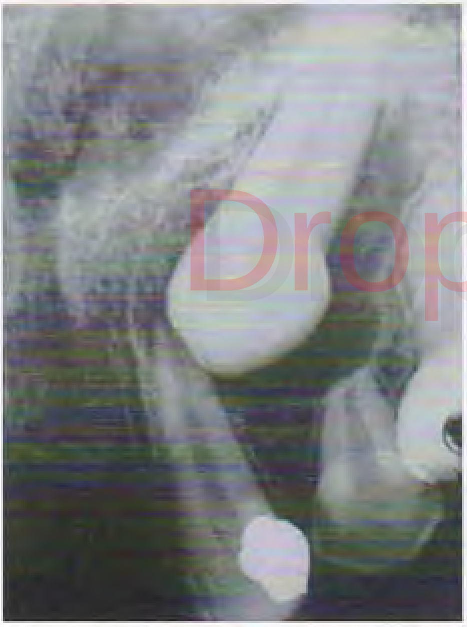
- Odontogenic adenomatoid tumor

ETIOLOGY

- A benign neoplasm of tooth-forming epithelium.
- Resembles the early bell stage of normal tooth development.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular radiolucent lesion with corticated margins.
- Commonly associated with the crown of an unerupted maxillary anterior tooth (usually a cuspid).



An adenomatoid odontogenic tumor associated with an unerupted maxillary cuspid tooth.

OTHER USEFUL CLINICAL INFORMATION

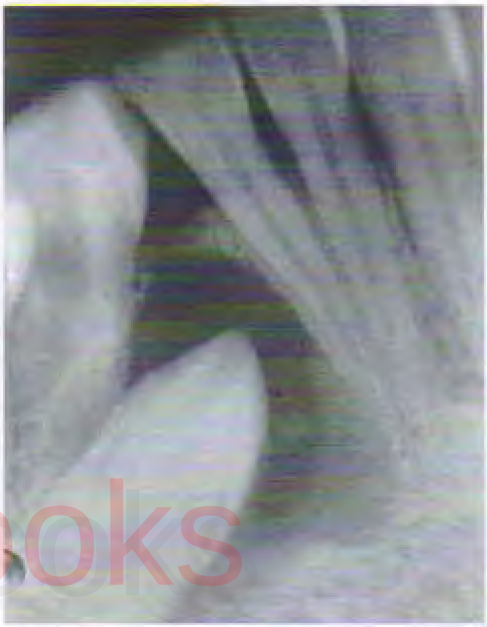
- More common in children.
- May be associated with cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Dentigerous cyst
- Odontogenic keratocyst
- Ameloblastoma
- Ameloblastic fibroma
- Calcifying odontogenic cyst

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



An adenomatoid odontogenic tumor associated with an unerupted mandibular cuspid tooth.

TREATMENT RECOMMENDATIONS

- Surgical curettage

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- An adenomatoid odontogenic tumor may be confused microscopically with the more aggressive ameloblastoma.
- An accurate diagnosis is essential because an adenomatoid odontogenic tumor requires only conservative surgical therapy and rarely recurs.
- An adenomatoid odontogenic tumor is initially radiolucent, but focal or diffuse calcifications can eventually develop within the tumor causing a mixed radiolucent-radiopaque appearance.

CALCIFYING ODONTOGENIC CYST

SYNONYMS

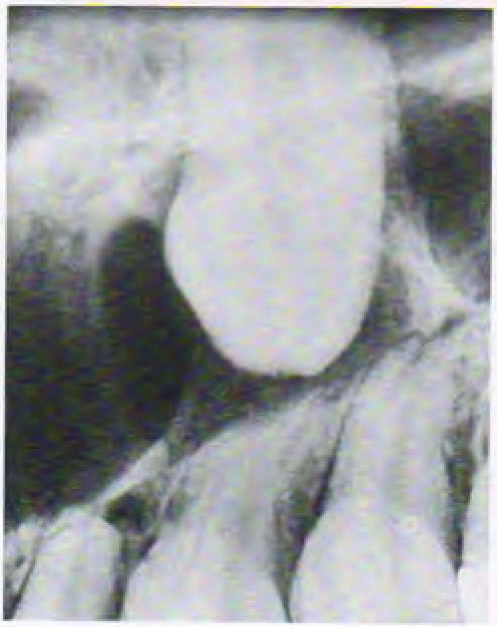
- Gorlin cyst

ETIOLOGY

- A developmental cyst that arises from tooth-forming epithelium.
- Pericoronal lesions develop from reduced enamel epithelium of the dental follicle.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular or multilocular radiolucent lesion.
- Most often associated with an unerupted cuspid.
- May cause erosion of the roots of adjacent teeth.



A calcifying odontogenic cyst associated with an unerupted maxillary cuspid tooth. The lesion caused erosion of the roots of adjacent teeth.

OTHER USEFUL CLINICAL INFORMATION

- More common in young adults.
- May be associated with cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Dentigerous cyst
- Odontogenic keratocyst
- Ameloblastoma
- Ameloblastic fibroma
- Adenomatoid odontogenic tumor

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical enucleation

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- A calcifying odontogenic cyst is initially a radiolucent lesion, but eventually, calcifications can develop within the cyst wall producing a mixed radiolucent-radiopaque appearance.
- A calcifying odontogenic cyst may occasionally occur in association with odontomas, adenomatoid odontogenic tumors, and ameloblastomas.

CALCIFYING EPITHELIAL ODONTOGENIC TUMOR

SYNONYMS

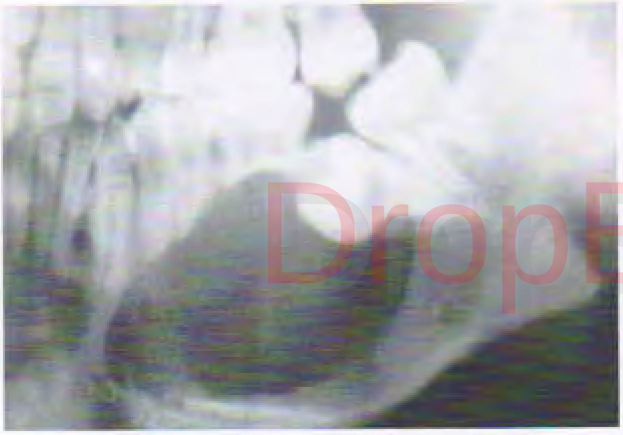
- Pindborg tumor

ETIOLOGY

- A benign neoplasm that arises from the reduced enamel epithelium that lines the dental follicle or from remnants of the dental lamina (rests of Serres).

TYPICAL RADIOGRAPHIC FEATURES

- A unilocular or multilocular radiolucent lesion with ill-defined margins.
- Commonly associated with the crown of an unerupted mandibular molar.



A calcifying epithelial odontogenic tumor associated with an unerupted second molar tooth.

OTHER USEFUL CLINICAL INFORMATION

- More common in adults.
- Cortical expansion may be present.

DIFFERENTIAL DIAGNOSIS

- Dentigerous cyst
- Odontogenic keratocyst
- Ameloblastoma
- Ameloblastic fibroma
- Adenomatoid odontogenic tumor
- Calcifying odontogenic cyst

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical resection is the treatment of choice.

FOLLOW-UP

- Because this neoplasm can exhibit multiple recurrences, close follow-up is advisable.

CLINICAL SIGNIFICANCE

- A calcifying epithelial odontogenic tumor is initially radiolucent, but eventually, calcifications develop within the tumor causing a mixed radiolucent-radiopaque appearance.

INTER-RADICULAR RADIOLUCENT LESIONS

GENERAL PRINCIPLES

- Lesions that appear as radiolucencies in the alveolar bone between adjacent tooth roots can represent inflammatory processes, developmental cysts or neoplasms of odontogenic origin.
- Some inter-radicular lesions are initially radiolucent, but eventually become radiopaque (these lesions are also included in the section on inter-radicular radiopaque lesions).
- The most common inter-radicular radiolucent lesions are of inflammatory origin.
- Inter-radicular lesions commonly displace or erode tooth roots.

LIST OF DISEASES

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Laterally-Displaced Periapical Abscess / Granuloma / Cyst 39

Lateral Periodontal Cyst 40

Odontogenic Keratocyst 41

Ameloblastoma 42

UNCOMMON DISEASES

Central Giant Cell Granuloma 43

Calcifying Odontogenic Cyst 44

Calcifying Epithelial Odontogenic Tumor 45

Nasopalatine Duct Cyst 46

Osteoporotic Bone Marrow Defect 47

OSTEOMYELITIS

SYNONYMS

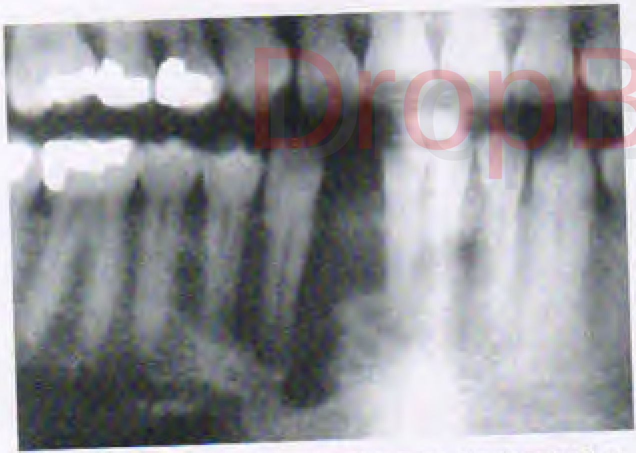
- Acute osteomyelitis

ETIOLOGY

- A destructive inflammatory process within bone most often caused by bacterial infections (staphylococci and streptococci are the usual causative organisms).
- Often represents direct extension of an untreated periapical abscess into alveolar bone at the root apex.

TYPICAL RADIOGRAPHIC FEATURES

- A moth-eaten radiolucent lesion with irregular margins.
- More common in the posterior mandible.
- Fragments of necrotic bone (sequestra) may be visible within the radiolucent areas.
- May perforate the cortex causing a pathologic fracture.



Acute osteomyelitis in the mandible following tooth extraction.

OTHER USEFUL CLINICAL INFORMATION

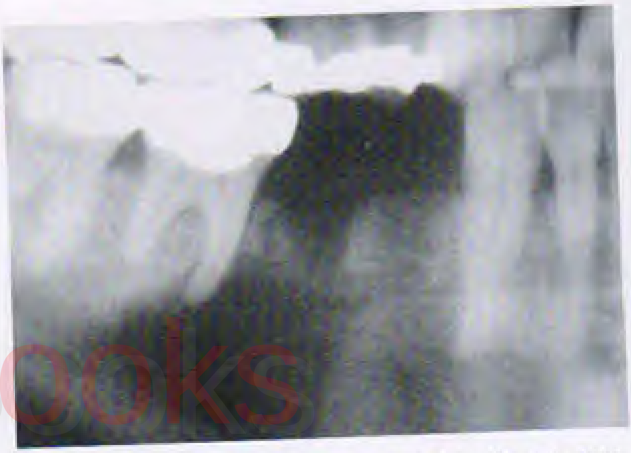
- More common in adults.
- May be associated with local discomfort or paresthesia of the lower lip.
- Commonly associated with fever and malaise.

DIFFERENTIAL DIAGNOSIS

- Bisphosphonate-related osteonecrosis of the jaws
- Primary intraosseous carcinoma
- Metastatic malignant neoplasms
- Osteogenic sarcoma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Acute osteomyelitis (osteoradionecrosis) in the mandible following tooth extraction. The patient had been previously irradiated for squamous cell carcinoma in the floor of the mouth.

TREATMENT RECOMMENDATIONS

- Systemic antibiotic therapy
- Surgical debridement of the necrotic bone

CLINICAL SIGNIFICANCE

- Bone that has been irradiated is especially susceptible to acute osteomyelitis (osteoradionecrosis).

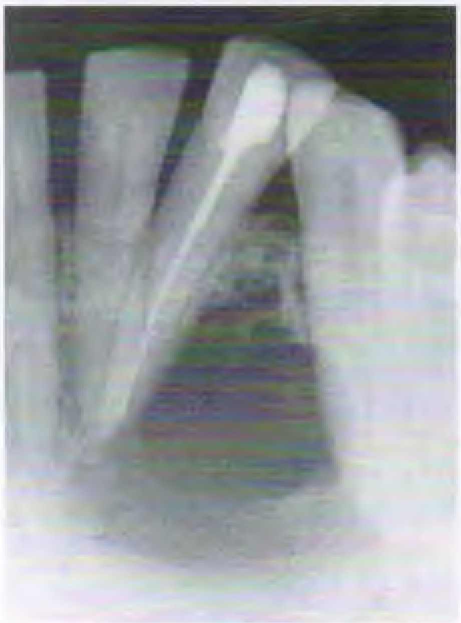
LATERALLY-DISPLACED PERIAPICAL ABSCESS / GRANULOMA / CYST

ETIOLOGY

- A periapical abscess, granuloma, or cyst that is displaced laterally because it is associated with the opening of a lateral canal, rather than the apical canal.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiolucent lesion displaced laterally along the tooth root.
- The tooth may show deep caries, a large restoration, or evidence of previous endodontic therapy.



A laterally-displaced periapical (radicular) cyst.

OTHER USEFUL CLINICAL INFORMATION

- The tooth will be nonvital.
- The tooth may (abscess) or may not (granuloma / cyst) be sensitive to percussion.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Lateral periodontal cyst
- Odontogenic keratocyst
- Ameloblastoma

DIAGNOSTIC STEPS

- Percuss the tooth (if the lesion is an abscess, the tooth will be sensitive to percussion; if it is a granuloma / cyst, the tooth will not be sensitive to percussion).
- Test the vitality of the pulp (it should be nonvital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Endodontic therapy if the tooth is restorable.
- Extraction if the tooth is not restorable.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- If untreated, laterally-displaced periapical abscess can develop into osteomyelitis, septicemia, Ludwig's angina, or cavernous sinus thrombosis.
- If untreated, laterally-displaced periapical granuloma can undergo acute exacerbation to form an abscess.
- In rare instances, squamous cell carcinoma could arise from the epithelial lining of a laterally-displaced periapical cyst.

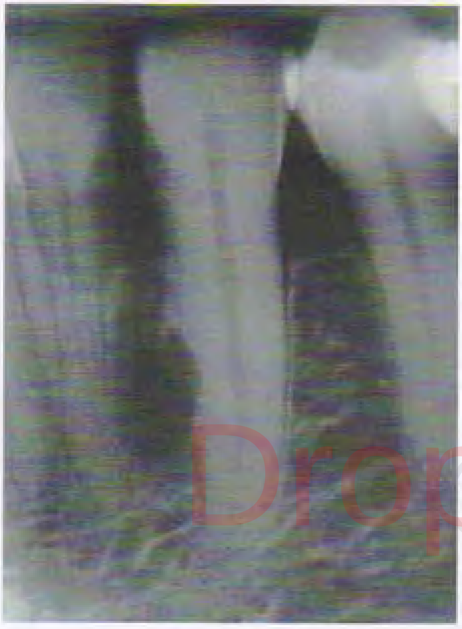
LATERAL PERIODONTAL CYST

ETIOLOGY

- A developmental cyst that arises from remnants of the dental lamina (rests of Serres).

TYPICAL RADIOGRAPHIC FEATURES

- A small circumscribed radiolucent lesion with corticated margins between the roots of adjacent teeth.
- May cause divergence of adjacent tooth roots.



A lateral periodontal cyst in the anterior mandible.

OTHER USEFUL CLINICAL INFORMATION

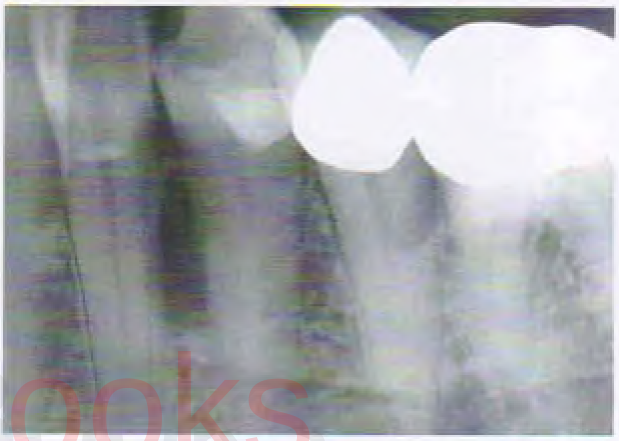
- More common in adults.
- Occurs most often between the mandibular premolars and between the maxillary lateral incisor and cuspid.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Laterally-displaced periapical abscess / granuloma / cyst
- Odontogenic keratocyst
- Ameloblastoma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A lateral periodontal cyst in the anterior mandible.

TREATMENT RECOMMENDATIONS

- Surgical enucleation

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Gingival cyst of the adult is the soft tissue counterpart of the lateral periodontal cyst.

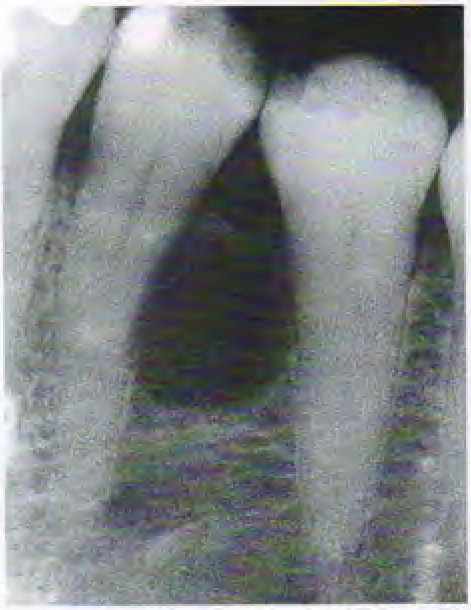
ODONTOGENIC KERATOCYST

ETIOLOGY

- An odontogenic cyst that commonly develops from ebriologic remnants of the dental lamina (rests of Serres).

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular radiolucent lesion with corticated margins.
- May cause divergence of adjacent tooth roots.



An odontogenic keratocyst in the mandible. The lesion caused divergence of the roots of adjacent teeth.

OTHER USEFUL CLINICAL INFORMATION

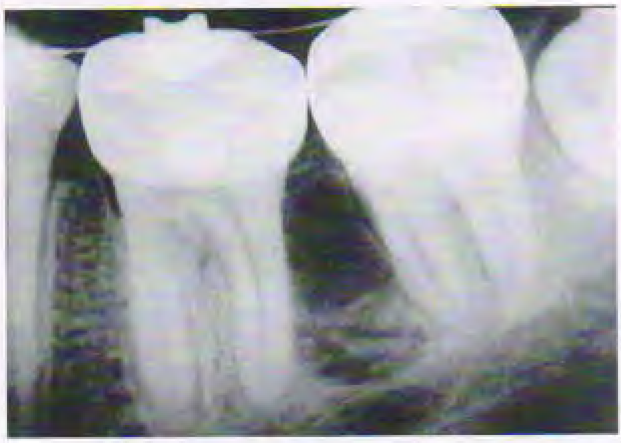
- More common in adults.
- Often causes cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Laterally-displaced periapical abscess / granuloma / cyst
- Lateral periodontal cyst
- Odontogenic keratocyst
- Ameloblastoma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



An odontogenic keratocyst in the mandible. The lesion caused divergence of the roots of adjacent teeth.

TREATMENT RECOMMENDATIONS

- Surgical enucleation is the treatment of choice for smaller lesions.
- More extensive surgical resection is necessary for larger lesions.

FOLLOW-UP

- Because of the recurrent potential of the lesion, close follow-up is essential.

CLINICAL SIGNIFICANCE

- Odontogenic keratocyst behaves more like a neoplasm than a developmental cyst (more than 30% of the lesions recur following surgical excision).
- Multiple odontogenic keratocysts are features of nevoid basal cell carcinoma syndrome (other components of the syndrome include bifid ribs and basal cell carcinomas).

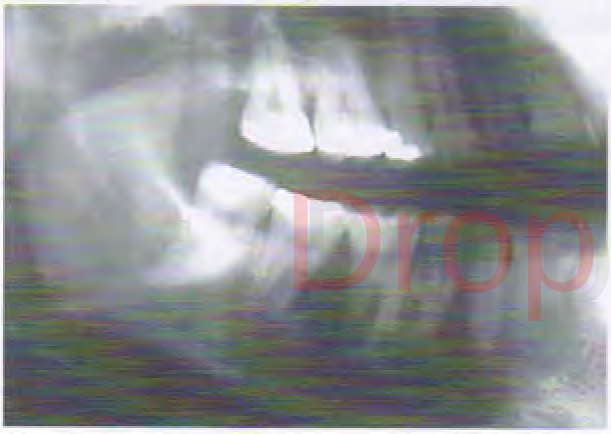
AMELOBLASTOMA

ETIOLOGY

- A benign odontogenic neoplasm that can develop from remnants of the dental lamina (rests of Serres), Hertwig's root sheath (rests of Malassez), reduced enamel epithelium lining the dental follicle, or basal cells of surface epithelium.
- Inter-radicular lesions arise from remnants of the dental lamina (rests of Serres).

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular or multilocular radiolucent lesion with corticated margins.
- The lesion may exhibit a soap-bubble appearance.
- May cause resorption of the roots of adjacent teeth.



A unilocular ameloblastoma in the posterior mandible.

OTHER USEFUL CLINICAL INFORMATION

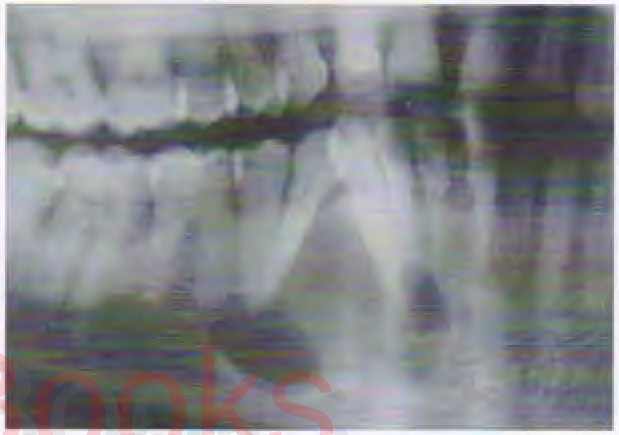
- More common in young and middle-aged adults.
- Commonly causes cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Laterally-displaced periapical abscess / granuloma / cyst
- Lateral periodontal cyst
- Odontogenic keratocyst

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A multilocular ameloblastoma in the anterior mandible.

TREATMENT RECOMMENDATIONS

- Wide surgical excision is the treatment of choice.

FOLLOW-UP

- Because of the recurrent potential of the lesion, close follow-up is essential.

CLINICAL SIGNIFICANCE

- These lesions are locally aggressive and have a high rate of recurrence.
- Ameloblastomas occasionally metastasize.

CENTRAL GIANT CELL GRANULOMA

SYNONYMS

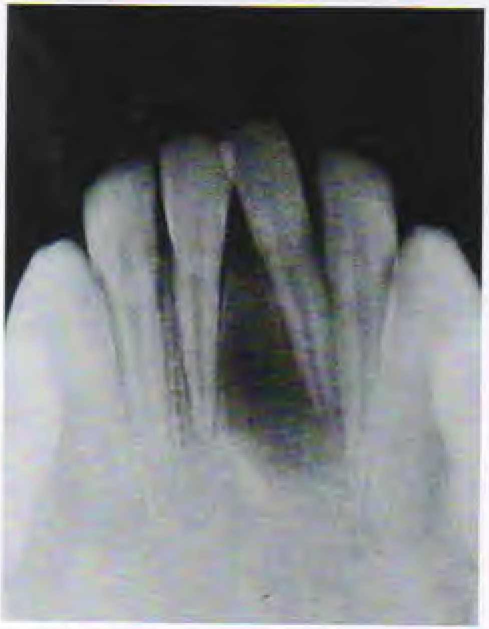
- Central giant cell lesion
- Central giant cell tumor

ETIOLOGY

- A reactive granulomatous proliferation containing multinucleated giant cells (generally thought to be osteoclasts).
- May represent a reparative response to inflammation within the bone.

TYPICAL RADIOGRAPHIC FEATURES

- A unilocular or multilocular radiolucent lesion with circumscribed or indistinct margins.
- Commonly located in the anterior mandible.
- Can cross the midline.
- May cause resorption of adjacent tooth roots.



A central giant cell granuloma in the anterior mandible.

OTHER USEFUL CLINICAL INFORMATION

- More common in young adults.
- More common in females.
- The teeth adjacent to the lesion are asymptomatic and vital.
- There may be cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Lateral periapical abscess / granuloma / cyst
- Lateral periodontal cyst
- Odontogenic keratocyst
- Ameloblastoma

DIAGNOSTIC STEPS

- Percuss the teeth (they should not be painful to percussion).
- Test the vitality of the teeth (they should test vital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Curettage is the treatment of choice for smaller lesions.
- Surgical excision may be necessary for larger lesions.
- Intralesional corticosteroid injections have been proposed as an alternative to surgical therapy.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- May be associated with aneurysmal bone cyst.
- May occasionally behave in a more aggressive fashion (central giant cell tumor).
- Microscopically identical to the "brown tumor" of hyperparathyroidism.

CALCIFYING ODONTOGENIC CYST

SYNONYMS

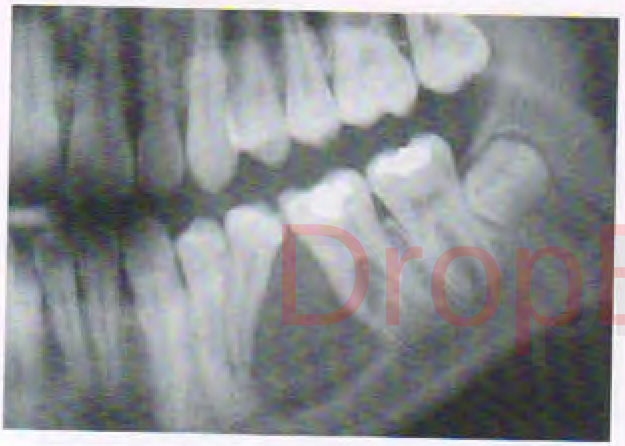
- Gorlin cyst

ETIOLOGY

- A developmental cyst that arises from tooth-forming epithelium.
- Inter-radicular lesions develop from remnants of the dental lamina (rests of Serres).

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular or multilocular radiolucent lesion.
- May cause erosion of adjacent tooth roots.



A calcifying odontogenic cyst in the posterior mandible. The lesion caused divergence and erosion of the roots of adjacent teeth.

OTHER USEFUL CLINICAL INFORMATION

- More common in young adults.
- May be associated with cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Laterally-displaced periapical abscess / granuloma / cyst
- Lateral periodontal cyst
- Odontogenic keratocyst
- Ameloblastoma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm diagnosis.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- A calcifying odontogenic cyst is initially a radiolucent lesion, but eventually, calcifications can develop within the cyst wall producing a mixed radiolucent-radiopaque appearance.
- A calcifying odontogenic cyst may occasionally occur in association with odontomas, adenomatoid odontogenic tumor, and ameloblastoma.

CALCIFYING EPITHELIAL ODONTOGENIC TUMOR

SYNONYMS

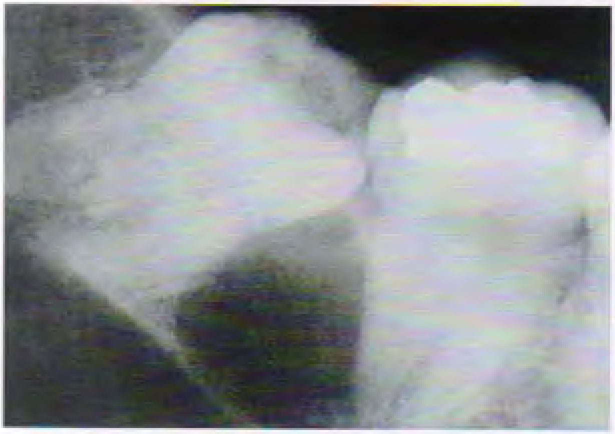
- Pindborg tumor

ETIOLOGY

- A benign neoplasm that arises from remnants of the dental lamina (rests of Serres).

TYPICAL RADIOGRAPHIC FEATURES

- A unilocular or multilocular radiolucent lesion with ill-defined margins.



A calcifying epithelial odontogenic tumor in the posterior mandible.

OTHER USEFUL CLINICAL INFORMATION

- More common in adults.
- Cortical expansion may be present.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Laterally-displaced periapical abscess / granuloma / cyst
- Lateral periodontal cyst
- Odontogenic keratocyst
- Ameloblastoma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical resection is the treatment of choice.

FOLLOW-UP

- Because this neoplasm can exhibit multiple recurrences, close follow-up is advisable.

CLINICAL SIGNIFICANCE

- A calcifying epithelial odontogenic tumor is initially radiolucent, but eventually, calcifications develop within the tumor causing a mixed radiolucent-radiopaque appearance.

NASOPALATINE DUCT CYST

SYNONYMS

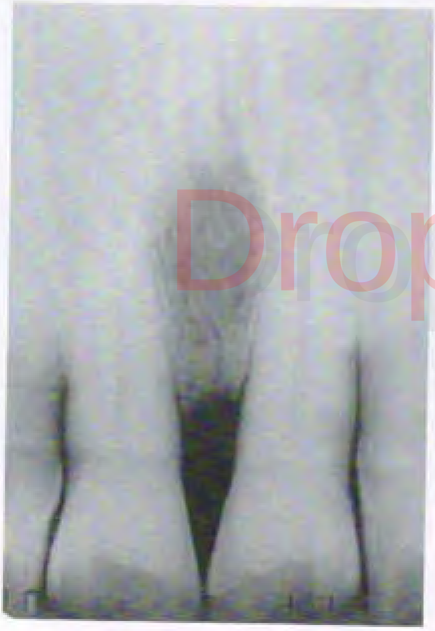
- Incisive canal cyst

ETIOLOGY

- A developmental cyst that arises from embryologic remnants of the Nasopalatine duct.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiolucent oval-shaped lesion.
- Located in the midline of the anterior maxilla at the site of the incisive foramen.
- May cause erosion of the adjacent tooth root.



A nasopalatine duct cyst in the anterior maxilla.

OTHER USEFUL CLINICAL INFORMATION

- The maxillary central incisors are asymptomatic and vital.
- May be associated with swelling of the incisive papillae.

DIFFERENTIAL DIAGNOSIS

- Because of its distinctive location and radiographic features, Nasopalatine duct cyst is infrequently confused with other inter-radicular lesions.

DIAGNOSTIC STEPS

- No diagnostic steps other than recognition of typical radiographic features.
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical excision

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- This lesion can also present as a periapical radiolucency.

OSTEOPOROTIC BONE MARROW DEFECT

SYNONYMS

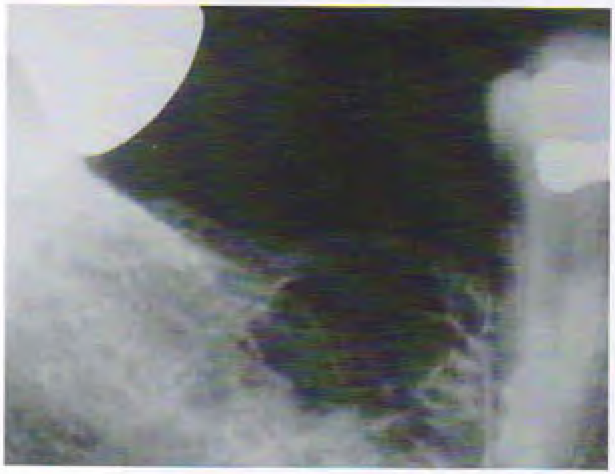
- Focal osteoporotic marrow defect

ETIOLOGY

- A focal accumulation of hematopoietic marrow that develops at the site of previous tooth extraction.

TYPICAL RADIOGRAPHIC FEATURES

- An ill-defined radiolucent lesion at the site of previous tooth extraction.



An osteoporotic bone marrow defect in the mandible.

OTHER USEFUL CLINICAL INFORMATION

- More common in middle-aged adults.
- More common in females.
- More common in the mandibular molar area.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Laterally-displaced periapical abscess / granuloma / cyst
- Lateral periodontal cyst
- Odontogenic keratocyst
- Ameloblastoma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Biopsy to confirm the diagnosis.
- No further treatment necessary.

CHRONIC PERIODONTITIS

SYNONYMS

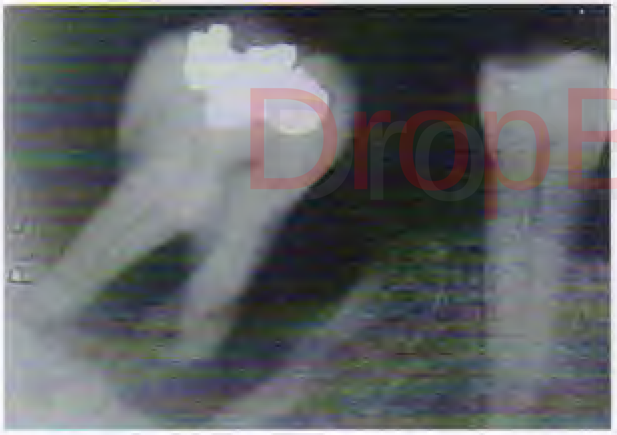
- Chronic periodontal disease

ETIOLOGY

- Pathogenic bacteria in dental plaque
- Predisposing factors include inadequate oral hygiene, aging, smoking, underlying systemic disease, and low socioeconomic status.

TYPICAL RADIOGRAPHIC FEATURES

- A radiolucent lesion with irregular margins
- Initially, the lesion may be localized to the bone of the alveolar crest, but it can eventually progress to involve the entire supporting bone.
- The lesions can be localized to a single tooth or generalized to involve all the teeth in an arch.



Chronic periodontitis with loss of supporting alveolar bone.

OTHER USEFUL CLINICAL INFORMATION

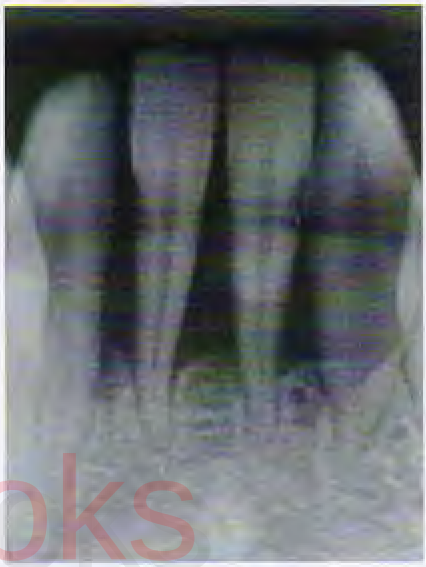
- Chronic periodontitis occurs with greatest frequency in adults.
- Associated soft tissue changes include swelling, redness, and bleeding of the diseases gingiva.
- The epithelial attachment will be lost and the depth of the gingival sulcus will increase as the disease progresses.
- Involved teeth exhibit accumulations of subgingival plaque.
- Involved teeth are commonly mobile.
- One or more periodontal abscesses may also be present.
- The lesions are usually not painful.

DIFFERENTIAL DIAGNOSIS

- Combined periodontic-endodontic lesions
- Langerhans cell disease
- Leukemia

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Chronic periodontitis in a patient with poorly controlled diabetes mellitus.

TREATMENT RECOMMENDATIONS

- Elimination of predisposing factors, if possible
- Scaling, root planing, curettage, or periodontal surgery may be indicated depending on the extent of the lesions.
- Procedures designed to regenerate alveolar bone or the epithelial attachment may be beneficial.
- Topical antibiotic therapy may aid in the resolution of refractory cases.

FOLLOW-UP

- Because of the chronic nature of the disease, close long-term follow-up is essential.

CLINICAL SIGNIFICANCE

- Refractory or rapidly progressive periodontal disease may indicate the presence of a serious systemic disease such as diabetes mellitus, leukemia, or acquired immunodeficiency syndrome.
- The presence of chronic periodontitis may increase the risk for heart disease, stroke, and diabetes mellitus.

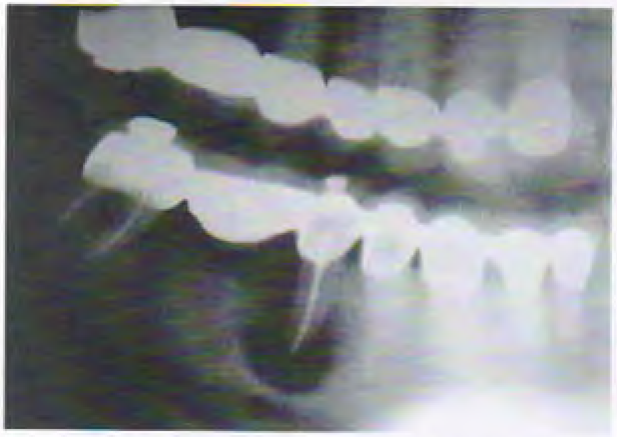
COMBINED PERIODONTIC-ENDODONTIC LESIONS

ETIOLOGY

- Periodontal extension of pulpal infection usually through a lateral canal, or pulpal progression of a periodontal infection usually through the apical foramen

TYPICAL RADIOGRAPHIC FEATURES

- A radiolucent lesion with irregular margins along one root surface or completely surrounding the root



A combined periodontic-endodontic lesion. Previous endodontic therapy had been unsuccessful.

OTHER USEFUL CLINICAL INFORMATION

- The involved tooth will be nonvital.
- The involved tooth may be sensitive to percussion.
- The involved tooth may be mobile.
- Periodontal probing will reveal loss of the epithelial attachment.
- Pus may drain from the gingival sulcus.

DIFFERENTIAL DIAGNOSIS

- Chronic periodontitis
- Langerhans cell disease
- Leukemia

DIAGNOSTIC STEPS

- Percuss the tooth (it may be painful to percussion).
- Test the vitality of the pulp (it should be nonvital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Endodontic-periodontic therapy if the tooth is restorable and there is adequate alveolar bone.
- Extraction with curettage of the lesion if the tooth is nonrestorable.

CLINICAL SIGNIFICANCE

- If untreated, a combined periodontic-endodontic lesion can develop into osteomyelitis, septicemia, Ludwig's angina, or cavernous sinus thrombosis.

LANGERHANS CELL DISEASE

SYNONYMS

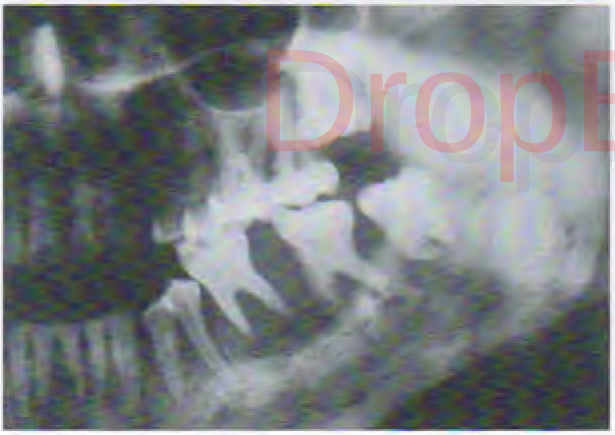
- Histiocytosis X
- Eosinophilic granuloma

ETIOLOGY

- A neoplastic proliferation of Langerhans cells (histiocytes)
- The disease can present in chronic focal, chronic disseminated, and acute disseminated forms.

TYPICAL RADIOGRAPHIC FEATURES

- A solitary punched-out radiolucent lesion completely surrounding the root of one or more teeth
- The involved teeth may appear to be floating in a radiolucent space.



Langerhan's cell disease (eosinophilic granuloma) in the posterior mandible. The teeth appeared to be floating in a radiolucent space.

OTHER USEFUL CLINICAL INFORMATION

- More common in children and young adults.
- Involved teeth are usually asymptomatic and vital.
- Involved teeth are commonly mobile.

DIFFERENTIAL DIAGNOSIS

- Chronic periodontitis
- Combined periodontic-endodontic lesions
- Leukemia

DIAGNOSTIC STEPS

- Percuss the teeth (they should not be painful to percussion).
- Test the vitality of the teeth (they should test vital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical excision is the treatment of choice for localized lesions.
- Chemotherapy is necessary for disseminated disease.

FOLLOW-UP

- Long-term follow-up is essential.

CLINICAL SIGNIFICANCE

- The acute disseminated form of the disease is often rapidly fatal.

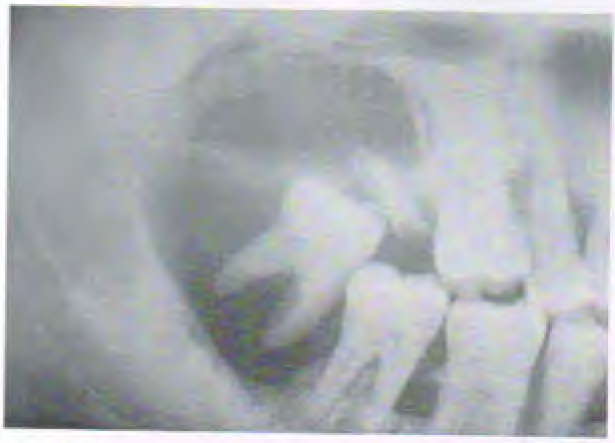
LEUKEMIA

ETIOLOGY

- Leukemias are malignant neoplasms that arise from white blood cell precursors in bone marrow.
- They are frequently associated with chromosomal abnormalities.
- Leukemias can arise from granulocytic precursors (granulocytic or myelogenous leukemia) or from lymphocytic precursors (lymphocytic leukemia).

TYPICAL RADIOGRAPHIC FEATURES

- A radiolucent lesion with irregular margins around one or more teeth.
- The involved teeth appear to be floating in a radiolucent space.



Alveolar bone loss caused by chronic leukemia. The teeth appeared to be floating in a radiolucent space.

OTHER USEFUL CLINICAL INFORMATION

- Acute leukemias are more common in children.
- Chronic leukemias are more common in adults.
- The involved teeth are often mobile.
- Other oral mucosal changes include ulcerations, gingival swelling, and petechial hemorrhages.
- Clinical signs and symptoms include fever, weight loss, anemia, and persistent infections.

DIFFERENTIAL DIAGNOSIS

- Chronic periodontitis
- Combined periodontic-endodontic lesions
- Langerhans cell disease

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Multidrug chemotherapy
- Total body irradiation followed by bone marrow transplantation

FOLLOW-UP

- Close long-term follow-up is essential.

CLINICAL SIGNIFICANCE

- Acute leukemias are very aggressive and have a poor prognosis.
- Chronic leukemias are less aggressive and have a better prognosis.

SCLERODERMA

SYNONYMS

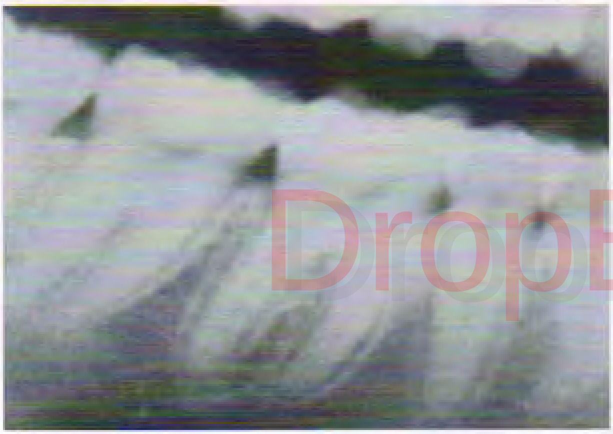
- Systemic sclerosis
- Progressive systemic sclerosis

ETIOLOGY

- A chronic autoimmune disease which causes fibrosis of the skin and visceral organs (heart, lungs, kidneys, and gastrointestinal tract).

TYPICAL RADIOGRAPHIC FEATURES

- Generalized widening of the periodontal membrane space
- Resorption of the mandibular ramus, condyle, and coronoid process



Widening of the periodontal membrane space. The patient had scleroderma.

OTHER USEFUL CLINICAL INFORMATION

- More common in middle-aged females.

DIFFERENTIAL DIAGNOSIS

- Chronic periodontitis
- Combined periodontic-endodontic lesions
- Osteogenic sarcoma

DIAGNOSTIC STEPS

- Skin biopsy reveals deposits of acellular collagen in the dermis.
- The presence of specific antinuclear antibodies can be demonstrated in the blood of patients with scleroderma.

TREATMENT RECOMMENDATIONS

- Treatment includes systemic corticosteroids, penicillamine, azathioprine, and supportive therapy.

FOLLOW-UP

- Long-term follow-up is essential.

CLINICAL SIGNIFICANCE

- Often associated with other autoimmune diseases such as rheumatoid arthritis, systemic lupus erythematosus, Sjögren's syndrome, and CREST syndrome.
- Because of cardiac, pulmonary, and renal involvement, the long-term prognosis is generally poor.

OSTEOGENIC SARCOMA

SYNONYMS

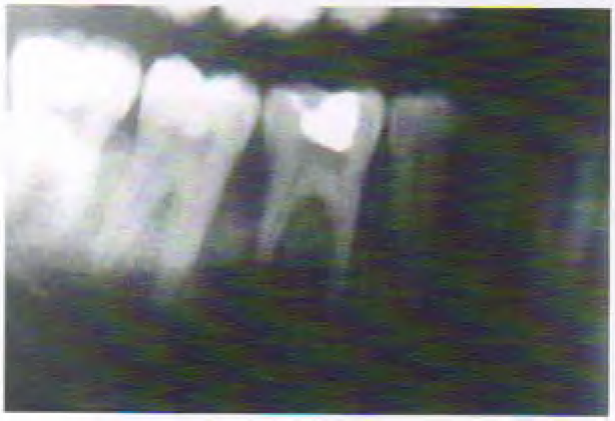
- Osteosarcoma

ETIOLOGY

- A malignant neoplasm of osteoblasts

TYPICAL RADIOGRAPHIC FEATURES

- Early lesions can present as irregular widening of the periodontal membrane space.
- More common in the posterior mandible.



Widening of the periodontal membrane space around a mandibular first molar tooth caused by early osteogenic sarcoma.

OTHER USEFUL CLINICAL INFORMATION

- More common in adult males.
- May be associated with focal cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Chronic periodontitis
- Combined periodontic-endodontic lesions
- Scleroderma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical resection is the treatment of choice.

FOLLOW-UP

- Because of the aggressive nature of this malignancy, long-term follow-up is essential.

CLINICAL SIGNIFICANCE

- The incidence of osteogenic sarcoma is higher in individuals with Paget's disease of bone.
- The prognosis for osteogenic sarcoma of the jaws is better than for osteogenic sarcoma arising in long bones of the skeleton.

RADIOLUCENT LESIONS NOT ASSOCIATED WITH TEETH

GENERAL PRINCIPLES

- Radiolucent lesions not associated with teeth can represent inflammatory, dysplastic, developmental, or neoplastic processes.

- These lesions may develop in areas once occupied by teeth (extraction sites) or in parts of the bone separated from existing teeth.

- Radiolucent lesions not associated with teeth can be either unilocular or multilocular.

- Multilocular radiolucencies not associated with teeth should be aspirated prior to surgical intervention to rule out the possibility of a central vascular lesion.

- Some radiolucent lesions not associated with teeth are initially radiolucent, but eventually become radiopaque (these lesions are also included in the section on radiopaque lesions not associated with teeth).

LIST OF DISEASES

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Aneurysmal Bone Cyst 63

Cemento-ossifying Fibroma 64

Stafne Bone Defect 65

Langerhans Cell Disease 66

Central Arteriovenous Malformation 67

RESIDUAL CYST

SYNONYMS

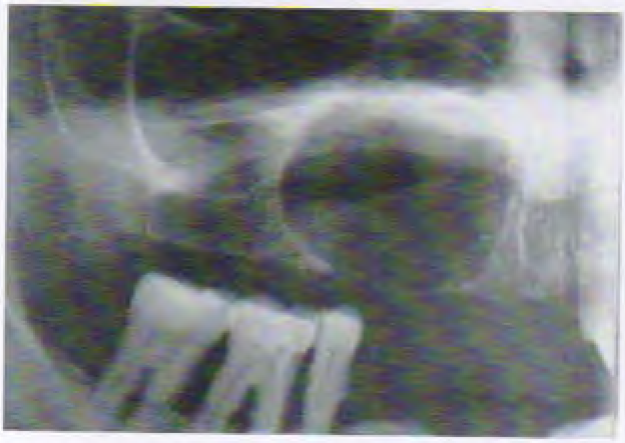
- Residual radicular cyst

ETIOLOGY

- A radicular (periapical) cyst that remains within the alveolar bone after the associated tooth has been removed.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular radiolucent lesion with corticated margins in an edentulous space previously occupied by a tooth.



A residual radicular cyst in the maxilla. The lesion was discovered on a routine dental radiograph.

OTHER USEFUL CLINICAL INFORMATION

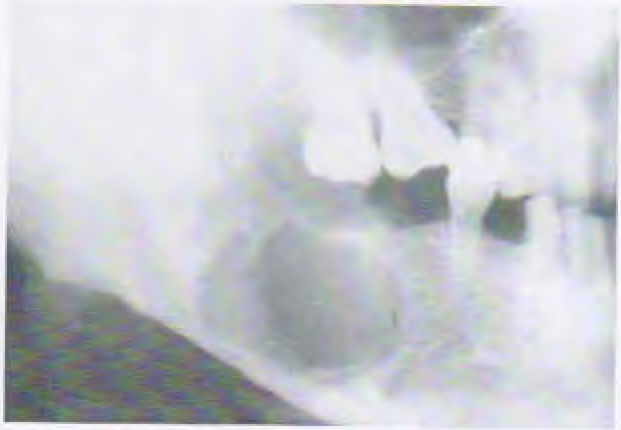
- More common in adults.
- There will be a history of extraction of a symptomatic tooth in the edentulous area.

DIFFERENTIAL DIAGNOSIS

- Cemento-osseous dysplasia
- Ameloblastoma
- Odontogenic keratocyst

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A residual radicular cyst in the mandible. The lesion was discovered on a routine dental radiograph.

TREATMENT RECOMMENDATIONS

- Surgical enucleation

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- In rare instances, squamous cell carcinoma could arise from the epithelial lining of a residual cyst.

FLORID CEMENTO-OSSEOUS DYSPLASIA

SYNONYMS

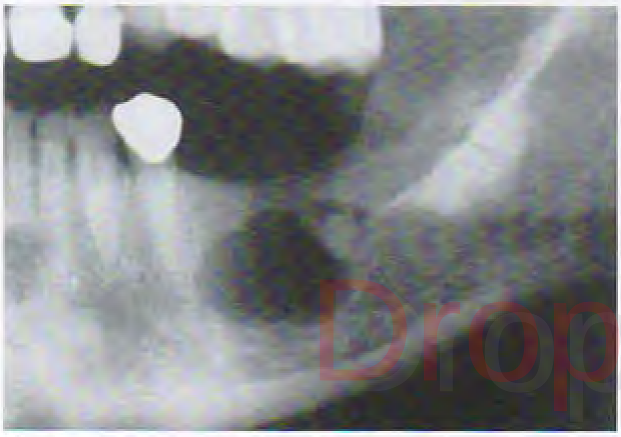
- Cemento-osseous dysplasia

ETIOLOGY

- A reactive proliferation in response to unknown factors.

TYPICAL RADIOGRAPHIC FEATURES

- Multiple, circumscribed radiolucencies in one or more quadrants
- More common in the posterior mandible.



Florid cemento-osseous dysplasia in the mandible. Radiopaque lesions of florid cemento-osseous dysplasia were also present.

OTHER USEFUL CLINICAL INFORMATION

- More common in middle-aged African-American females.
- The lesions are often discovered on routine dental radiographs.
- They are usually asymptomatic, but may occasionally be associated with low-grade chronic discomfort.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Ameloblastoma
- Odontogenic keratocyst

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- No treatment necessary unless secondarily infected.
- Lesions which become secondarily infected are treated with surgical debridement and systemic antibiotics.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- With time, calcified material (bone and cementum) will be deposited within the lesions and they will appear radiopaque.
- May be associated with periapical cemento-osseous dysplasia.
- The use of the term dysplasia does not mean that these lesions are premalignant.

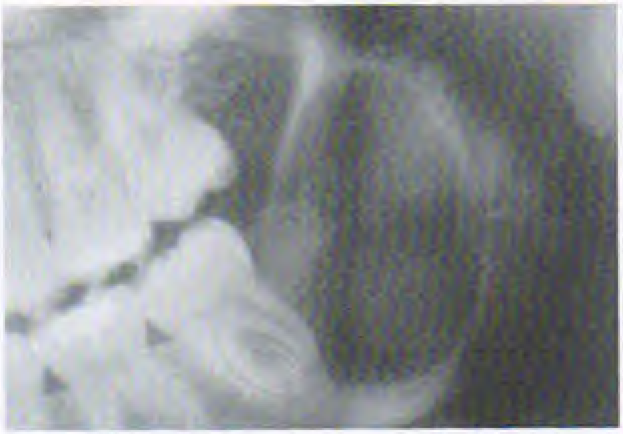
AMELOBLASTOMA

ETIOLOGY

- A benign odontogenic neoplasm that can develop from remnants of the dental lamina (rests of Serres), Hertwig's root sheath (rests of Malassez), reduced enamel epithelium lining the dental follicle, or basal cells of surface epithelium.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular or multilocular radiolucent lesion with corticated margins
- The lesion may exhibit a soap-bubble appearance.



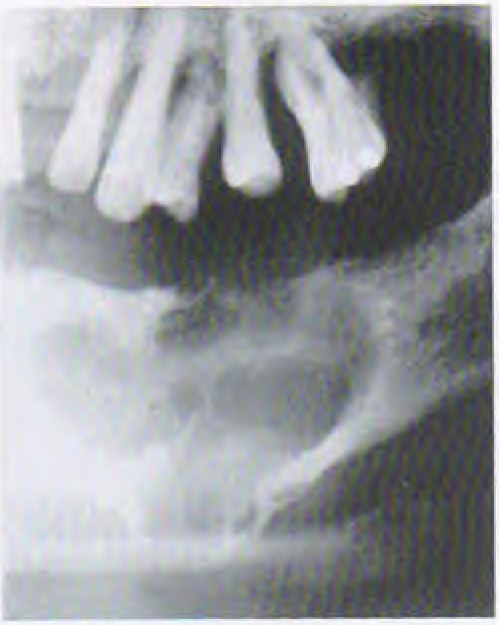
A unilocular ameloblastoma in the posterior mandible. The third molar tooth had been previously extracted.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Cemento-osseous dysplasia
- Odontogenic keratocyst
- Central giant cell granuloma
- Central arteriovenous malformation

DIAGNOSTIC STEPS

- Multilocular lesions should be aspirated prior to surgery to rule out the possibility of a vascular lesion.
- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A multilocular ameloblastoma in the posterior mandible. Teeth in the area had been extracted many years ago.

TREATMENT RECOMMENDATIONS

- Wide surgical excision is the treatment of choice.

FOLLOW-UP

- Because of the recurrent potential of this lesion, close follow-up is essential.

CLINICAL SIGNIFICANCE

- These lesions are locally aggressive and have a high rate of recurrence.
- Ameloblastomas occasionally metastasize.

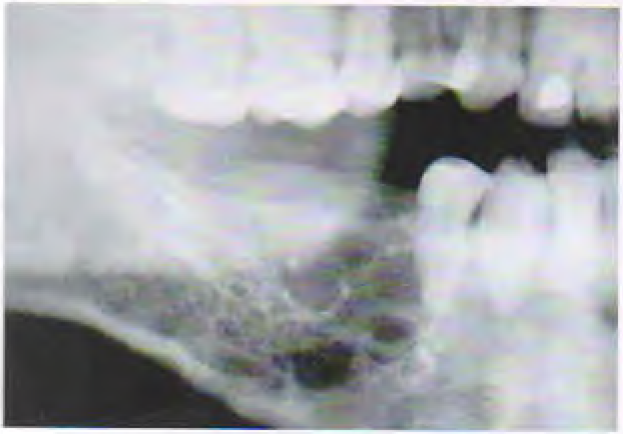
ODONTOGENIC KERATOCYST

ETIOLOGY

- An odontogenic cyst that develops from remnants of the dental lamina (rest of Serres)

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular or multilocular radiolucent lesion with corticated margins



An odontogenic keratocyst in the posterior mandible. This lesion had recurred after surgical enucleation.

OTHER USEFUL CLINICAL INFORMATION

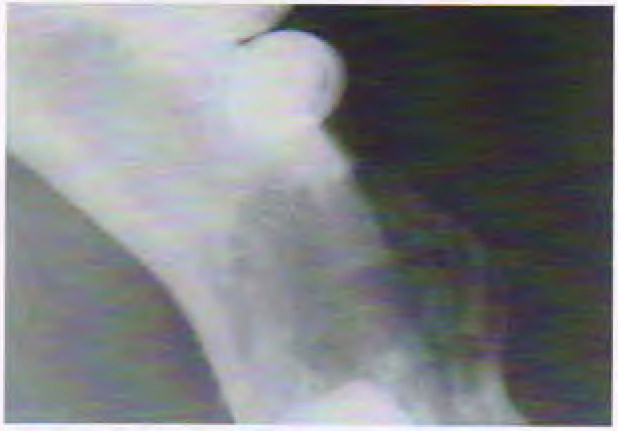
- More common in adults.
- Often causes cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Cemento-osseous dysplasia
- Ameloblastoma
- Central giant cell granuloma
- Central arteriovenous malformation

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



An odontogenic keratocyst in the mandible. The lesion caused expansion of the cortex.

TREATMENT RECOMMENDATIONS

- Surgical enucleation is the treatment of choice for smaller lesions.
- More extensive surgical resection is necessary for larger lesions.

FOLLOW-UP

- Because of the recurrent potential of this lesion, close follow-up is essential.

CLINICAL SIGNIFICANCE

- Odontogenic keratocyst behaves more like an aggressive benign neoplasm than a developmental cyst (more than 30% of the lesions recur following surgical excision).
- Multiple odontogenic keratocysts are a feature of nevoid basal cell carcinoma syndrome (other components of the syndrome include bifid ribs and basal cell carcinomas).

ANEURYSMAL BONE CYST

ETIOLOGY

- A reactive process that may represent a variant of central giant cell granuloma.
- Not a true cyst (does not have an epithelial lining).

TYPICAL RADIOGRAPHIC FEATURES

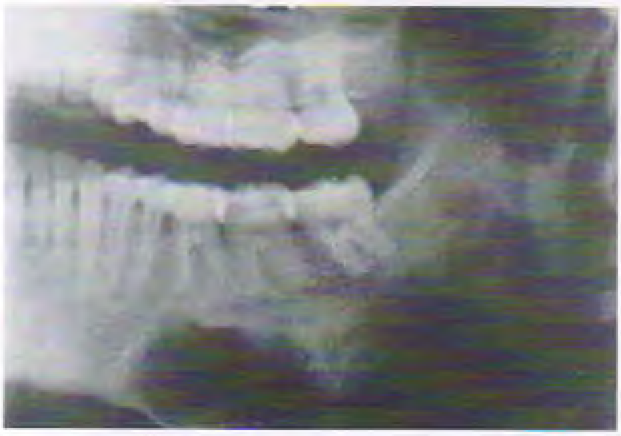
- A circumscribed multilocular radiolucent lesion.
- More common in the posterior mandible.
- May cause prominent expansion of the inferior border.

DIFFERENTIAL DIAGNOSIS

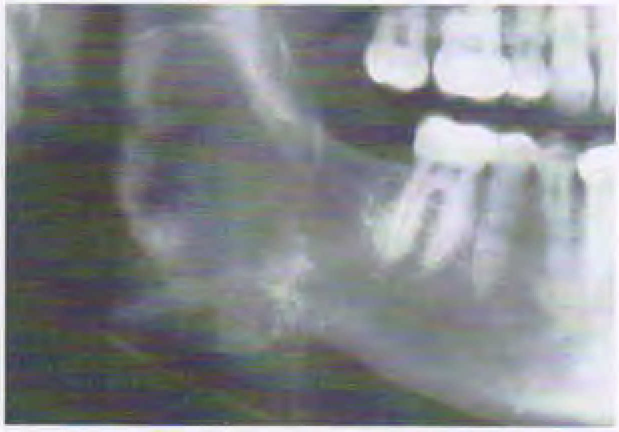
- Ameloblastoma
- Odontogenic keratocyst
- Central giant cell granuloma
- Central arteriovenous malformation

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



An aneurysmal bone cyst in the mandibular. Blood under low pressure could be aspirated from the lesion, but there was no bruit on auscultation.



An aneurysmal bone cyst in the posterior mandible. There was prominent expansion of the inferior border of the mandible.

OTHER USEFUL CLINICAL INFORMATION

- More common in young adults.
- May be associated with cortical expansion.
- Blood can be aspirated from the lesion because it contains large vascular spaces; however, there is no associated bruit (common in arteriovenous malformations).

TREATMENT RECOMMENDATIONS

- Surgical enucleation is the treatment of choice.

CLINICAL SIGNIFICANCE

- May be associated with central giant cell granuloma or fibrous dysplasia.

CEMENTO-OSSIFYING FIBROMA

SYNONYMS

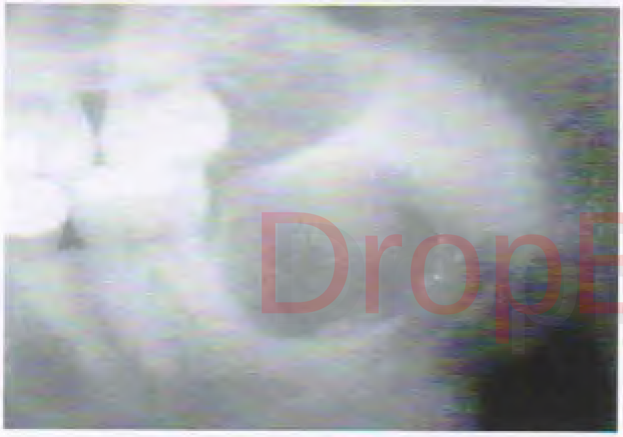
- Cementifying fibroma

ETIOLOGY

- A benign fibro-osseous lesion containing cementum and bone

TYPICAL RADIOGRAPHIC FEATURES

- A unilocular or multilocular radiolucent with corticated margins
- More common in the posterior mandible.



Cemento-ossifying fibroma in the posterior mandible. The lesion caused expansion of the cortex.

OTHER USEFUL CLINICAL INFORMATION

- More common in children and young adults.
- Commonly associated with cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Cemento-osseous dysplasia
- Ameloblastoma
- Odontogenic keratocyst
- Central arteriovenous malformation

DIAGNOSTIC STEPS

- Multilocular lesions should be aspirated prior to surgery to rule out the possibility of a vascular lesion.
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical enucleation is the treatment of choice.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Cemento-ossifying fibroma is initially a radiolucent lesion, but eventually, calcifications develop within the lesion producing a radiopaque appearance.
- An aggressive form of this lesion (juvenile ossifying fibroma) is more likely to recur following conservative therapy.

STAFNE BONE DEFECT

SYNONYMS

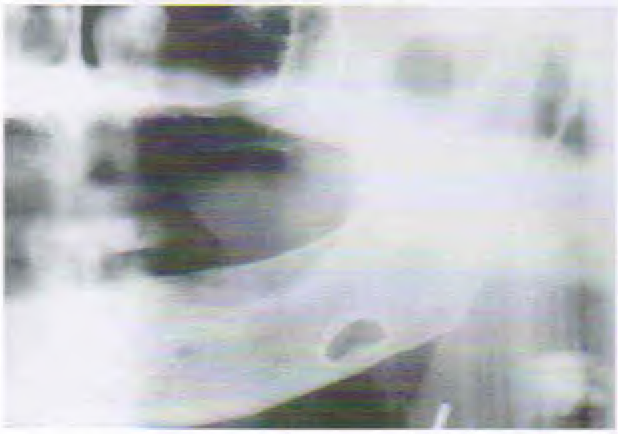
- Stafne bone cyst
- Lingual mandibular salivary gland depression

ETIOLOGY

- A depression in the lingual cortex of the mandible containing an accessory lobe of the submandibular salivary gland

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular radiolucency with corticated margins
- Located in the posterior mandible below the inferior alveolar canal



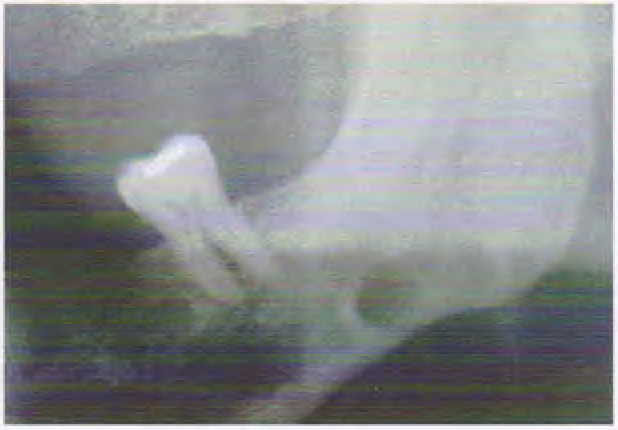
A Stafne bone defect in the posterior mandible. The radiolucency was below the inferior alveolar canal.

DIFFERENTIAL DIAGNOSIS

- Because of its distinctive location and radiographic features, Stafne bone defect is infrequently confused with other radiolucent lesions not associated with teeth.

DIAGNOSTIC STEPS

- No diagnostic steps other than recognition of the typical radiographic features.
- Sialography will confirm that the tissue in the depression is salivary gland.



A Stafne bone defect in the posterior mandible. The radiolucency was below the inferior alveolar canal.

TREATMENT RECOMMENDATIONS

- No treatment necessary.

FOLLOW-UP

- Periodic re-evaluation.

LANGERHANS CELL DISEASE

SYNONYMS

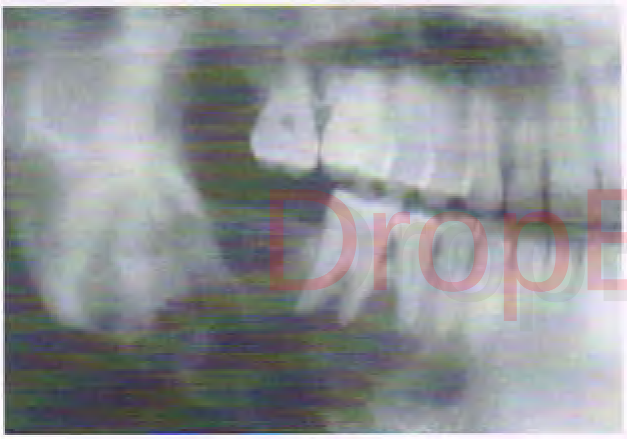
- Histiocytosis X
- Eosinophilic granuloma

ETIOLOGY

- A neoplastic proliferation of Langerhans cells (histiocytes)
- The disease can present in chronic focal, chronic disseminated, and acute disseminated forms.

TYPICAL RADIOGRAPHIC FEATURES

- A solitary punched-out radiolucent lesion



Langerhan's cell disease (eosinophilic granuloma) in the posterior mandible.

OTHER USEFUL CLINICAL INFORMATION

- More common in children and young adults.

DIFFERENTIAL DIAGNOSIS

- Residual cyst
- Cemento-osseous dysplasia
- Ameloblastoma
- Odontogenic keratocyst
- Central giant cell granuloma
- Cemento-ossifying fibroma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical excision is the treatment of choice for localized lesions.
- Chemotherapy is necessary for disseminated disease.

FOLLOW-UP

- Long term follow-up is essential.

CLINICAL SIGNIFICANCE

- The acute disseminated form of the disease is often rapidly fatal.

CENTRAL ARTERIOVENOUS MALFORMATION

SYNONYMS

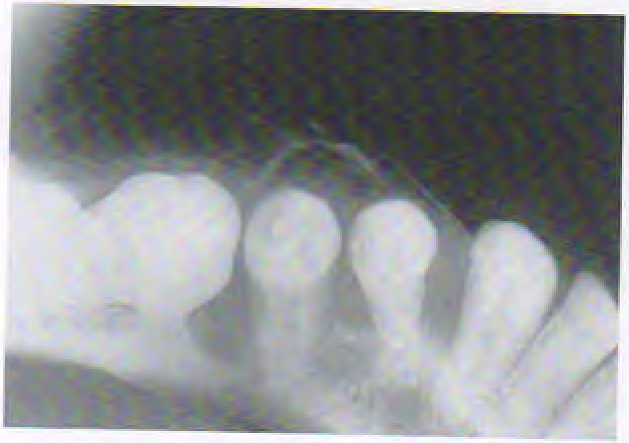
- Central hemangioma

ETIOLOGY

- A defect in the development of blood vessels causing a vascular malformation within bone
- Blood in the malformed vessels is under high arterial pressure.

TYPICAL RADIOGRAPHIC FEATURES

- A multilocular radiolucent lesion with corticated margins
- May exhibit a soap-bubble appearance.
- More common in the mandible.



A central arteriovenous malformation in the mandible. Blood under high pressure could be aspirated from the lesion, and there was a distinct bruit on auscultation.

OTHER USEFUL CLINICAL INFORMATION

- More common in children and young adults.
- More common in females.
- Typically associated with a bruit on auscultation.

DIFFERENTIAL DIAGNOSIS

- Ameloblastoma
- Odontogenic keratocyst
- Central giant cell granuloma
- Aneurysmal bone cyst

DIAGNOSTIC STEPS

- Aspiration of the lesion will produce bright red blood under arterial pressure.
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Embolization of the lesion is the treatment of choice.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- A related benign neoplasm of blood vessels, central hemangioma, contains blood under low pressure.

RADIOLUCENT LESIONS WITH IRREGULAR MARGINS

GENERAL PRINCIPLES

- Radiolucent lesions with irregular margins can represent inflammatory processes, primary malignant neoplasms and metastatic malignant neoplasms.
- The term "moth-eaten" is commonly used to describe the radiographic appearance of these lesions.
- The most common radiolucent lesions with irregular margins are the result of osteomyelitis.
- Some lesions with irregular margins are initially radiolucent, but eventually become radiopaque (these lesions are also included in the section on radiopaque lesions with irregular margins).

LIST OF DISEASES

COMMON DISEASES

Osteomyelitis 70

Bisphosphonate-related Osteonecrosis of the Jaws 71

UNCOMMON DISEASES

Primary Intraosseous Carcinoma 72

Metastatic Malignant Neoplasms 73

Osteogenic Sarcoma 74

BISPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAWS

SYNONYMS

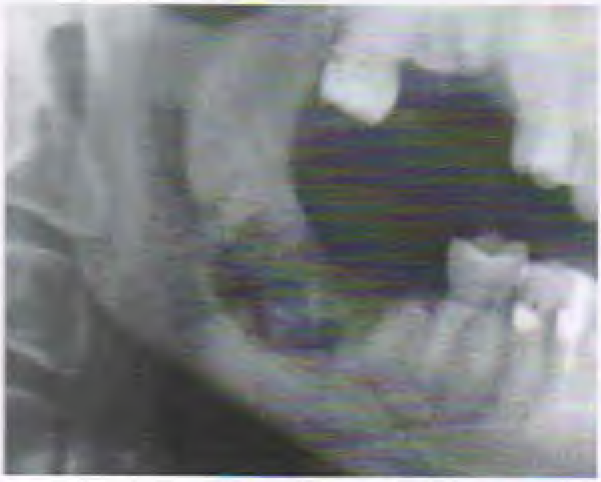
- BRONJ

ETIOLOGY

- Associated with the use of bisphosphonates which are used in the treatment of Paget's disease of bone, osteoporosis, multiple myeloma, and bone metastases from breast cancer.
- The bisphosphonates interfere with osteoclast function thus inhibiting normal bone remodeling.
- Dentoalveolar trauma, especially tooth extraction, increases the risk of BRONJ.
- BRONJ is encountered more often with the use of potent intravenous bisphosphonates.

TYPICAL RADIOGRAPHIC FEATURES

- A moth-eaten radiolucent lesion with irregular margins.
- More common in the posterior mandible.
- Fragments of necrotic bone (sequestra) may be visible within the radiolucent areas.
- May perforate the cortex causing a pathologic fracture.



BRONJ involving the posterior mandible at the site of a recent tooth extraction. The patient had been taking an oral bisphosphonate for two years for the treatment of osteoporosis.

OTHER USEFUL CLINICAL INFORMATION

- More common in adult females.
- Patients have a history of bisphosphonates treatment.
- Patient typically reports a recent tooth extraction at the site of osteonecrosis.

DIFFERENTIAL DIAGNOSIS

- Osteomyelitis
- Primary intraosseous carcinoma
- Metastatic malignant neoplasms
- Osteogenic sarcoma

DIAGNOSTIC STEPS

- History of bisphosphonates therapy confirms the diagnosis.

TREATMENT RECOMMENDATIONS

- Eliminate existing dental disease before the use of bisphosphonates
- Antibacterial mouth rinses
- Systemic antibiotic therapy
- Systemic pain control
- Surgical debridement

FOLLOW-UP

- Close follow-up is essential.

CLINICAL SIGNIFICANCE

- May complicate treatment of future dental disease.

PRIMARY INTRAOSSEOUS CARCINOMA

SYNONYMS

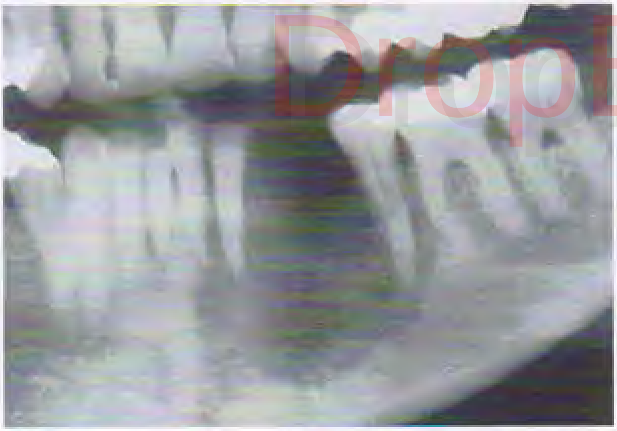
- Intraosseous squamous cell carcinoma
- Intraosseous mucoepidermoid carcinoma

ETIOLOGY

- Malignant epithelial neoplasms arising primarily within bone
- Primary intraosseous carcinomas include squamous cell carcinoma arising from the epithelial lining of an odontogenic cyst and mucoepidermoid carcinoma arising from salivary gland tissue entrapped in bone

TYPICAL RADIOGRAPHIC FEATURES

- A moth-eaten radiolucent lesion with irregular margins
- May perforate the cortex causing a pathologic fracture.
- More common in the posterior mandible.



Primary intraosseous in the anterior mandible. The patient complained of paresthesia of the lower lip.

OTHER USEFUL CLINICAL INFORMATION

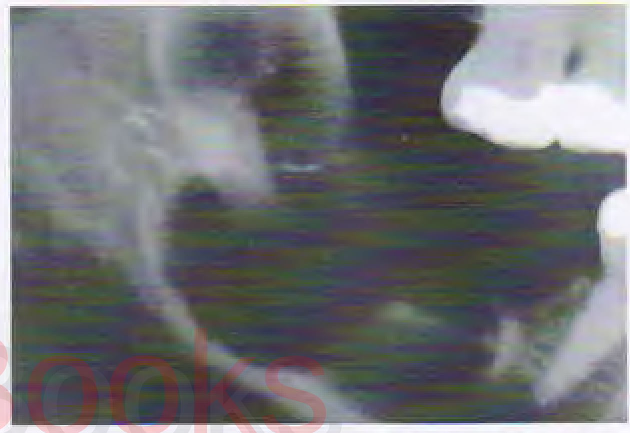
- More common in adults.
- May be associated with local discomfort or paresthesia of the lower lip.
- May be associated with regional lymph node metastasis.

DIFFERENTIAL DIAGNOSIS

- Bisphosphonate-related osteonecrosis of the jaws
- Osteomyelitis
- Metastatic malignant neoplasms
- Osteogenic sarcoma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Primary intraosseous carcinoma in the posterior mandible. The patient complained of paresthesia of the lower lip.

TREATMENT RECOMMENDATIONS

- Wide surgical resection of the lesion
- Resection of regional lymph nodes if clinically warranted

FOLLOW-UP

- Because of the probability of local recurrence and distant metastasis, close follow-up is essential.

CLINICAL SIGNIFICANCE

- Local recurrence or distant metastasis is associated with a poor prognosis.

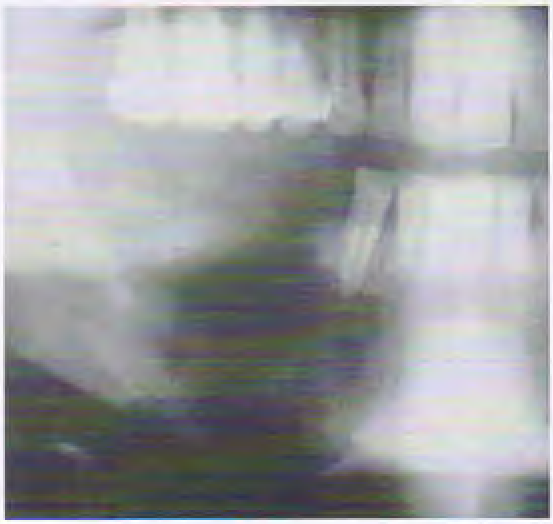
METASTATIC MALIGNANT NEOPLASMS

ETIOLOGY

- Malignant neoplasms can spread through blood vessels (hematogenous metastasis) to the jaws.
- Primary malignancies include carcinomas arising from lung, breast, colon, and prostate.

TYPICAL RADIOGRAPHIC FEATURES

- A moth-eaten radiolucent lesion with irregular margins
- May perforate the cortex to cause a pathologic fracture.
- More common in the posterior mandible.



Metastatic colon cancer in the posterior mandible. The patient complained of paresthesia of the lower lip.

OTHER USEFUL CLINICAL INFORMATION

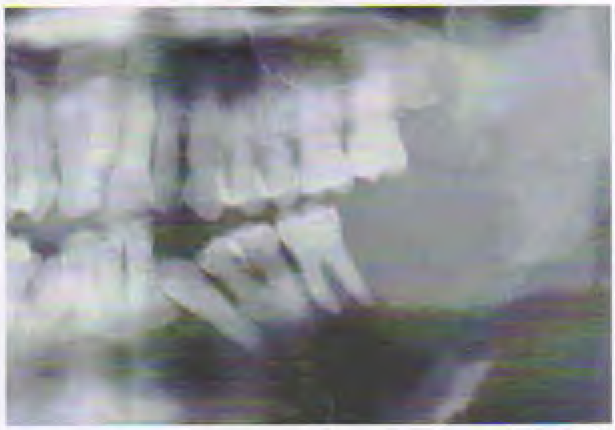
- More common in adult males.
- May be associated with local discomfort and paresthesia of the lower lip.

DIFFERENTIAL DIAGNOSIS

- Bisphosphonate-related osteonecrosis of the jaws
- Osteomyelitis
- Primary intraosseous carcinoma
- Osteogenic sarcoma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Metastatic lung cancer in the posterior mandible. The tumor caused a pathologic fracture of the inferior border of the mandible.

TREATMENT RECOMMENDATIONS

- Surgical resection
- Radiation therapy if clinically warranted

FOLLOW-UP

- Close follow-up is essential.

CLINICAL SIGNIFICANCE

- The metastatic lesion may be the first indication of disease.
- Metastatic malignancies to the jaws are associated with a very poor prognosis.

OSTEOGENIC SARCOMA

SYNONYMS

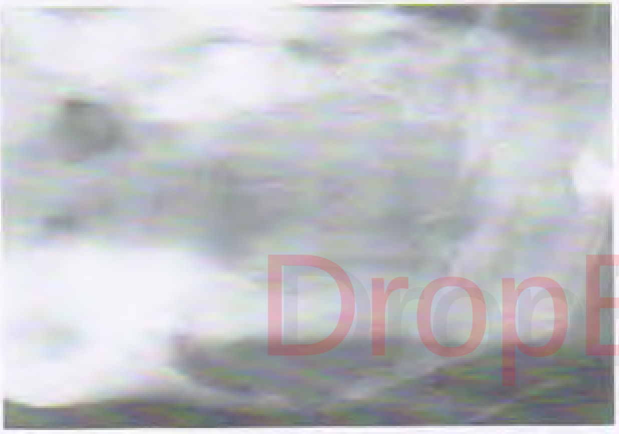
- Osteosarcoma

ETIOLOGY

- A malignant neoplasm of osteoblasts

TYPICAL RADIOGRAPHIC FEATURES

- A moth-eaten radiolucent lesion with irregular margins
- May perforate the cortex to cause a pathologic fracture.
- More common in the posterior mandible.



Osteogenic sarcoma of the mandible in an edentulous patient. The patient complained of paresthesia of the lower lip.

OTHER USEFUL CLINICAL INFORMATION

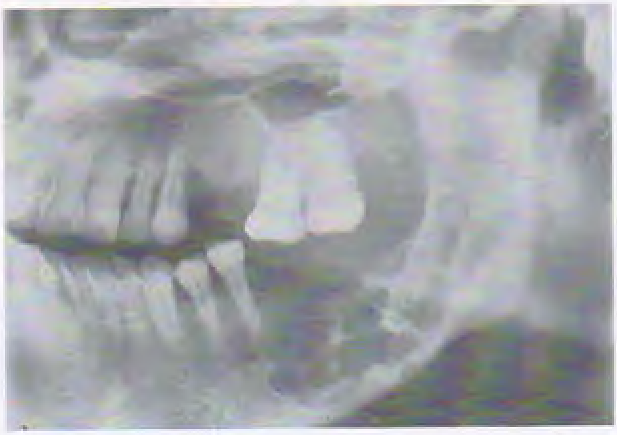
- More common in adult males.
- May be associated with cortical expansion.
- May be associated with local discomfort and paresthesia of the lower lip.

DIFFERENTIAL DIAGNOSIS

- Bisphosphonate-related osteonecrosis of the jaws
- Osteomyelitis
- Primary intraosseous carcinoma
- Metastatic malignant neoplasms

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Osteogenic sarcoma of the posterior mandible. The patient complained of paresthesia of the lower lip.

TREATMENT RECOMMENDATIONS

- Surgical resection is the treatment of choice.

FOLLOW-UP

- Because of the aggressive nature of this malignancy, long-term follow-up is essential.

CLINICAL SIGNIFICANCE

- The incidence of osteogenic sarcoma is higher in individuals with Paget's disease of bone.
- The prognosis for osteogenic sarcoma of the jaws is better than for osteogenic sarcoma arising in long bones of the skeleton.

PERIAPICAL RADIOPAQUE LESIONS

GENERAL PRINCIPLES

- Lesions that appear as radiopacities at the root apex can represent inflammatory, dysplastic, or neoplastic processes.
- Some periapical radiopaque lesions are initially radiolucent (these lesions are also included in section on periapical radiolucent lesions).
- Periapical cemento-osseous dysplasia and idiopathic osteosclerosis are the most common periapical radiopacities.
- It is important to remember that when the term dysplasia is applied to a lesion in bone it does not indicate premalignancy.

LIST OF DISEASES

COMMON DISEASES

Periapical Cemento-osseous Dysplasia 76
Idiopathic Osteosclerosis 77
Focal Sclerosing Osteomyelitis 78
Antral Pseudocyst 79
Exostoses 80

UNCOMMON DISEASES

Cementoblastoma 81
Cemento-ossifying Fibroma 82

PERIAPICAL CEMENTO-OSSEOUS DYSPLASIA

SYNONYMS

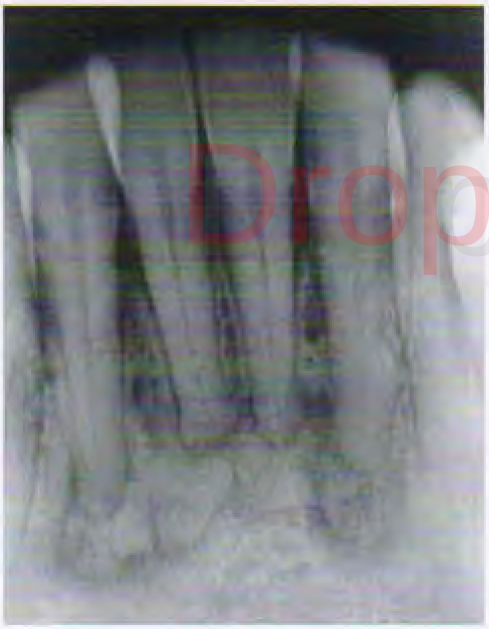
- Cemental dysplasia
- Cementoma

ETIOLOGY

- A reactive proliferation in response to unknown factors

TYPICAL RADIOGRAPHIC FEATURES

- Circumscribed radiopaque lesions with distinct radiolucent margins at the ends of the roots of multiple mandibular anterior teeth
- The teeth involved are usually free of caries or restorations.



Periapical cemento-osseous dysplasia. The teeth are asymptomatic and vital.

OTHER USEFUL CLINICAL INFORMATION

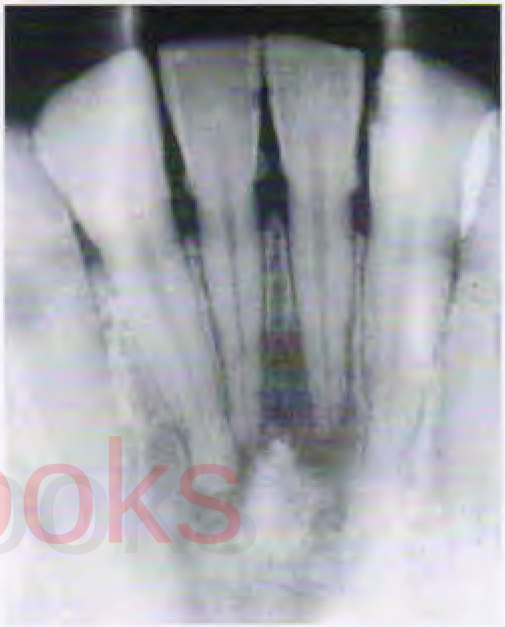
- The lesions are asymptomatic.
- They are usually discovered on routine dental radiographs.
- More common in middle-aged African-American females.

DIFFERENTIAL DIAGNOSIS

- Because of its distinctive location and radiographic features, periapical cemento-osseous dysplasia is infrequently confused with other periapical radiopacities.

DIAGNOSTIC STEPS

- No diagnostic steps other than recognition of the typical radiographic features.



Periapical cemento-osseous dysplasia. The teeth are asymptomatic and vital.

TREATMENT RECOMMENDATIONS

- No treatment necessary.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Early lesions appear as multiple periapical radiolucencies.
- May be associated with florid cemento-osseous dysplasia.
- The use of the term dysplasia does not mean that these lesions are premalignant.

FOCAL SCLEROSING OSTEOMYELITIS

SYNONYMS

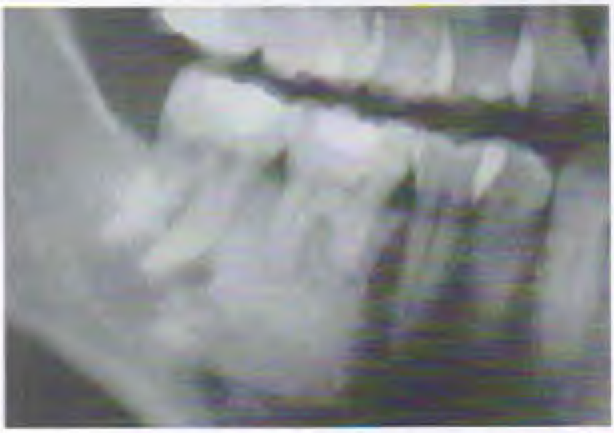
- Focal chronic sclerosing osteomyelitis
- Condensing osteitis

ETIOLOGY

- Chronic osteomyelitis that develops at the root apex of a tooth with chronic pulpitis secondary to deep caries

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiopaque lesion at the root apex of a tooth with deep caries or a large restoration
- A distinct periodontal membrane space is usually present (the radiopacity does not appear to merge with the cementum of the root apex).
- A radiolucent margin may surround the radiopacity.



Focal sclerosing osteomyelitis. The patient complained of a dull toothache.

OTHER USEFUL CLINICAL INFORMATION

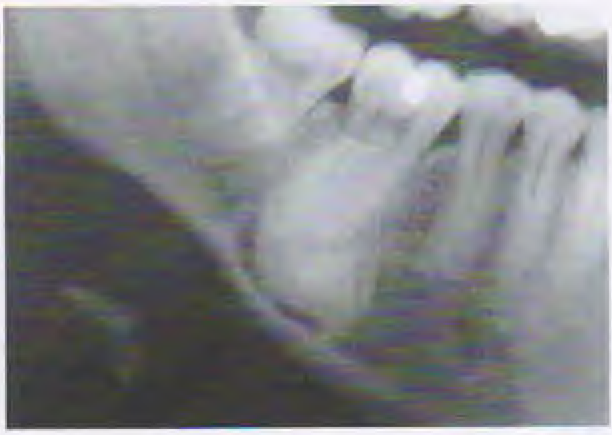
- A mandibular premolar or molar tooth is the most frequently involved.
- The tooth may be asymptomatic, or there may be chronic pain of low intensity.
- The tooth is usually not sensitive to percussion.
- The pulp is usually nonvital.

DIFFERENTIAL DIAGNOSIS

- Idiopathic osteosclerosis
- Cementoblastoma
- Cemento-ossifying fibroma

DIAGNOSTIC STEPS

- Percuss the tooth (it should not be sensitive to percussion).
- Test the vitality of the pulp (it usually tests nonvital).
- Microscopic examination of periapical tissue is necessary to confirm the diagnosis.



Focal sclerosing osteomyelitis. The patient complained of a dull toothache.

TREATMENT RECOMMENDATIONS

- Endodontic therapy if the tooth is restorable.
- Extraction if the tooth is not restorable.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Early lesions appear as periapical radiolucencies.

ANTRAL PSEUDOCYST

SYNONYMS

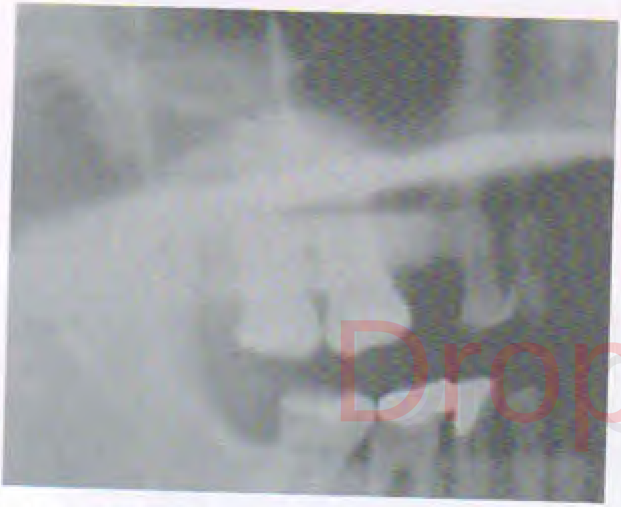
- Antral polyp

ETIOLOGY

- Inflammatory fluid caused by an odontogenic or sinus infection that accumulates under and elevates the mucosal lining of the maxillary antrum.

TYPICAL RADIOGRAPHIC FEATURES

- A dome-shaped uniformly radiopaque mass arising from the floor of the maxillary antrum.



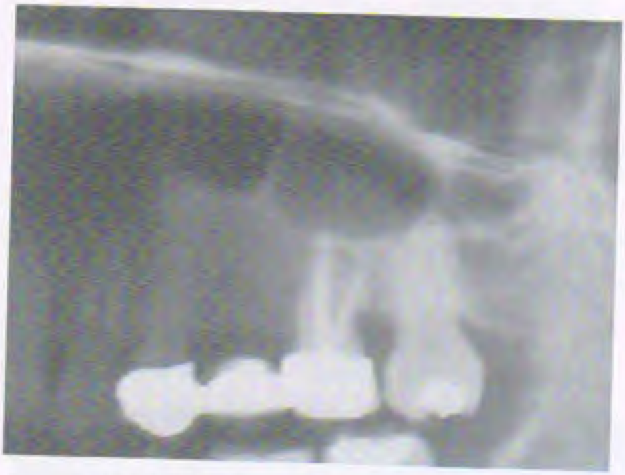
A dome-shaped antral pseudocyst in the maxillary sinus adjacent to the root apices of the maxillary molar teeth.

OTHER USEFUL CLINICAL INFORMATION

- The lesion is usually asymptomatic.
- The lesion is typically discovered on routine dental radiographs.
- It may occur more frequently during the cold winter months.

DIFFERENTIAL DIAGNOSIS

- Because of its distinctive location and radiographic features, the antral pseudocyst is infrequently confused with other periapical radiopaque lesions.



An antral pseudocyst adjacent to the root apices of an endodontically-treated maxillary molar tooth.

TREATMENT RECOMMENDATIONS

- Because it is harmless, no treatment is necessary for antral lesion.
- Odontogenic or sinus infection should be treated, if present.

FOLLOW-UP

- Periodic re-evaluation.

EXOSTOSES

SYNONYMS

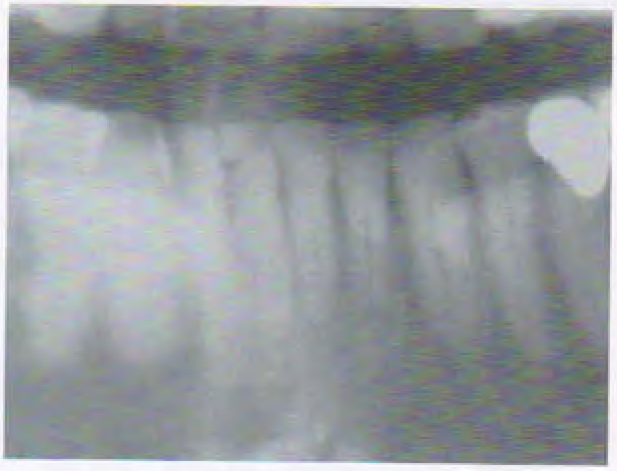
- Palatal torus
- Mandibular tori
- Buccal exostoses
- Palatal exostoses

ETIOLOGY

- Developmental defect
- A mass of dense bone extending from the cortex of alveolar or palatal bone.

TYPICAL RADIOGRAPHIC FEATURES

- Circumscribed radiopaque mass superimposed over adjacent teeth.



Mandibular tori superimposed over the roots of mandibular teeth.

OTHER USEFUL CLINICAL INFORMATION

- More common in adults.
- Typically asymptomatic.

DIFFERENTIAL DIAGNOSIS

- Because of its distinctive location and radiographic features, exotoses are infrequently confused with other radiopaque lesions not associated with teeth.

TREATMENT RECOMMENDATIONS

- Treatment is usually not required.
- May require surgical excision if repeatedly subjected to trauma or if they interfere with insertion of a dental prosthesis.

FOLLOW-UP

- Periodic re-evaluation.

CEMENTOBLASTOMA

SYNONYMS

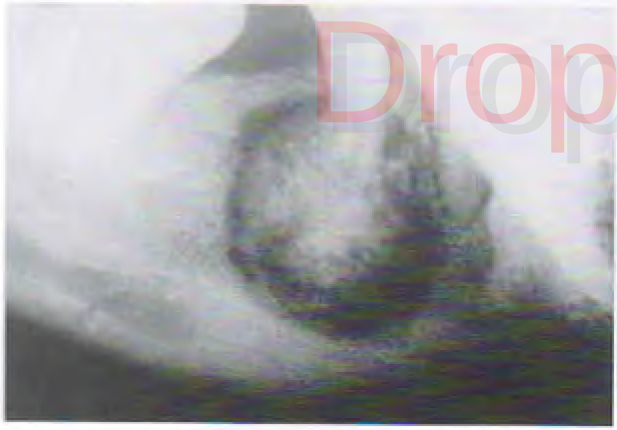
- Benign cementoblastoma
- True cementoma

ETIOLOGY

- A benign neoplasm of cementoblasts that develops at the root apex

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiopaque lesion that appears to be confluent with the root surface cementum (a distinct periodontal membrane space is not present).
- A thin radiolucent margin is usually visible around the radiopaque mass.
- Most often involves a mandibular molar tooth.



Cementoblastoma. A distinct radiolucent margin encircles the radiopaque mass.

OTHER USEFUL CLINICAL INFORMATION

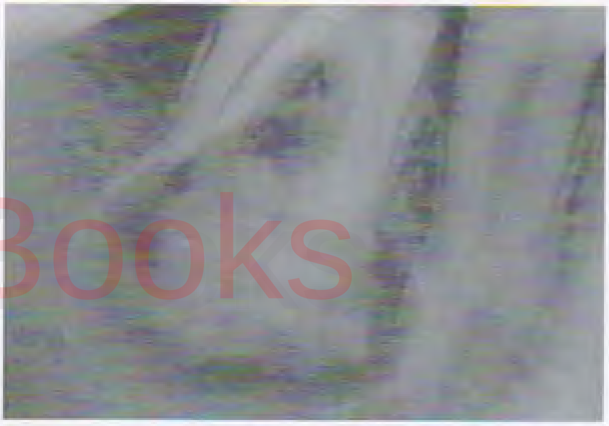
- More common in young adults.
- The involved tooth is asymptomatic and vital.
- Percussion of the tooth causes a dull sound.
- May cause cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Idiopathic osteosclerosis
- Focal sclerosing osteomyelitis
- Cemento-ossifying fibroma

DIAGNOSTIC STEPS

- Percuss the involved tooth (it should not be painful to percussion, but will exhibit a dull sound).
- Test the vitality of the involved tooth (it should test vital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Cementoblastoma. A distinct radiolucent margin encircles the radiopaque mass.

TREATMENT RECOMMENDATIONS

- Surgical excision

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Early lesions appear as periapical radiolucencies.

CEMENTO-OSSIFYING FIBROMA

SYNONYMS

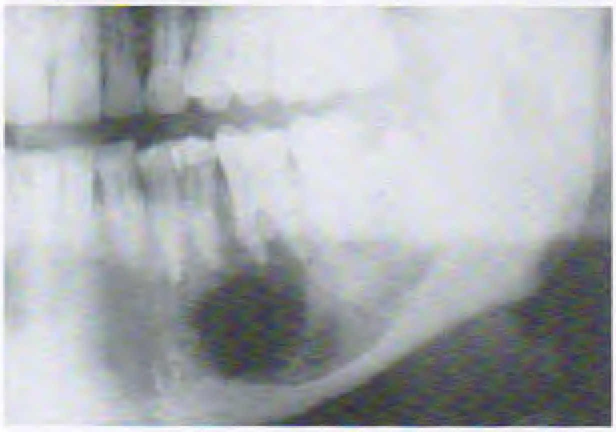
- Cementifying fibroma

ETIOLOGY

- A benign fibro-osseous lesion containing cementum and bone

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed mottled radiopaque lesion
- A thin radiolucent margin is usually visible around the radiopaque mass.
- More common in the posterior mandible.
- May cause resorption or displacement of adjacent tooth roots.



Cemento-ossifying fibroma in the posterior mandible.

OTHER USEFUL CLINICAL INFORMATION

- More common in children and young adults.
- Commonly associated with cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Idiopathic osteosclerosis
- Focal sclerosing osteomyelitis
- Cementoblastoma

DIAGNOSTIC STEPS

- Percuss the adjacent tooth (it should not be painful to percussion).
- Test the vitality of adjacent tooth (it should test vital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical enucleation is the treatment of choice.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- An aggressive form of this lesion (juvenile ossifying fibroma) is more likely to recur following conservative therapy.

PERICORONAL RADIOPAQUE LESIONS

GENERAL PRINCIPLES

- Lesions that appear as radiopacities around the crown of an unerupted tooth are either developmental cysts or neoplasms that originate from tooth-forming epithelium
- Some pericoronal radiopaque lesions are initially radiolucent (these lesions are included in the section on pericoronal radiolucent lesions).
- These lesions typically present with a mixed radiolucent-radiopaque appearance.
- Odontoma is the most common pericoronal radiopacities.

LIST OF DISEASES

COMMON DISEASES

Odontoma 84
Adenomatoid Odontogenic Tumor 85

UNCOMMON DISEASES

Calcifying Odontogenic Cyst 86
Calcifying Epithelial Odontogenic Tumor 87

ODONTOMA

SYNONYMS

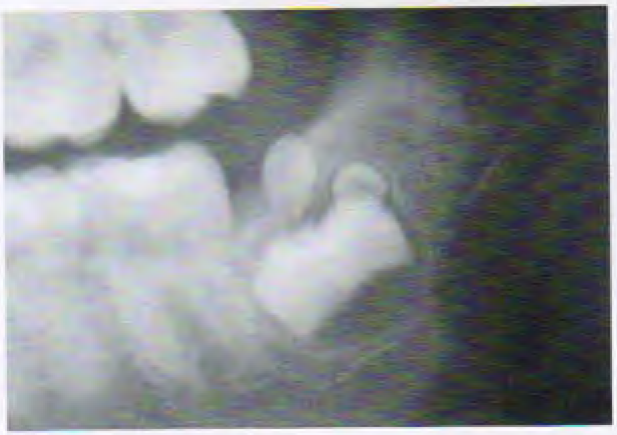
- Compound odontoma
- Complex odontoma

ETIOLOGY

- A benign odontogenic neoplasm that can produce all the tissues found in a mature tooth (enamel, dentin, cementum, and pulp).

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed lesion containing miniature teeth (compound odontoma) or radiopaque masses that do not resemble teeth (complex odontoma).
- More common in the maxilla.



A compound odontoma associated with an unerupted mandibular third molar tooth.

OTHER USEFUL CLINICAL INFORMATION

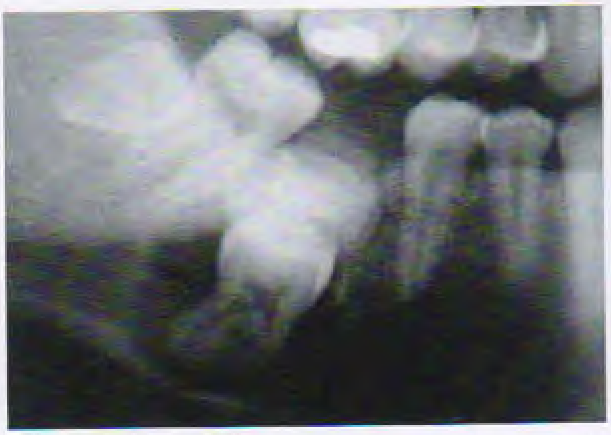
- More common in children and young adults.
- Prevents eruption of the associated tooth (the lesion is often discovered because the affected tooth fails to erupt).

DIFFERENTIAL DIAGNOSIS

- Adenomatoid odontogenic tumor
- Calcifying odontogenic cyst
- Calcifying epithelial odontogenic tumor

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A complex odontoma associates with an unerupted mandibular third molar tooth.

TREATMENT RECOMMENDATIONS

- Surgical enucleation

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Odontomas can occasionally be associated with dentigerous cysts and calcifying odontogenic cysts.

ADENOMATOID ODONTOGENIC TUMOR

SYNONYMS

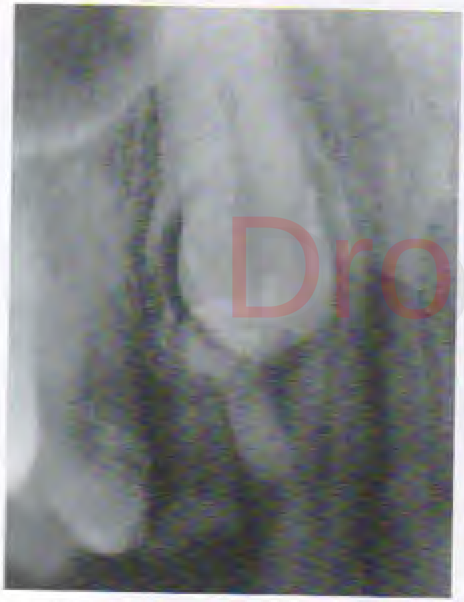
- Odontogenic adenomatoid tumor

ETIOLOGY

- A benign neoplasm of tooth-forming epithelium
- Resembles the early bell stage of normal tooth development

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular lesion with focal or diffuse calcifications producing a mixed radiolucent-radiopaque appearance
- Commonly associated with the crown of an unerupted maxillary anterior tooth (usually a cuspid)



An adenomatoid odontogenic tumor associated with an unerupted maxillary cuspid tooth.

OTHER USEFUL CLINICAL INFORMATION

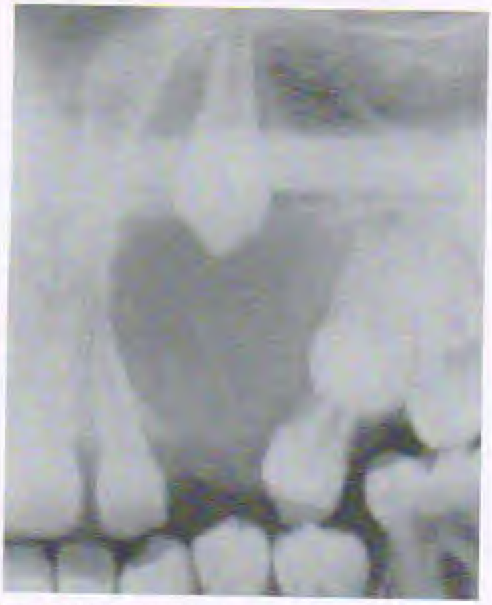
- More common in children.
- May be associated with cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Odontoma
- Calcifying odontogenic cyst
- Calcifying epithelial odontogenic tumor

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



An adenomatoid odontogenic tumor associated with an unerupted maxillary cuspid tooth.

TREATMENT RECOMMENDATIONS

- Surgical curettage

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Adenomatoid odontogenic tumor may be confused microscopically with the more aggressive ameloblastoma.
- An accurate diagnosis is essential because adenomatoid odontogenic tumor requires only conservative surgical therapy and rarely recurs.
- Adenomatoid odontogenic tumor is initially radiolucent, but focal or diffuse calcifications can eventually develop within the tumor causing a mixed radiolucent-radiopaque appearance.

INTER-RADICULAR RADIOPAQUE LESIONS

GENERAL PRINCIPLES

- Lesions that appear as radiopacities in the alveolar bone between adjacent tooth roots can represent inflammatory processes, developmental cysts or benign neoplasms.
- Some inter-radicular radiopaque lesions are initially radiolucent (these lesions are included in the section on inter-radicular radiolucent lesions.
- The most common inter-radicular radiopaque lesion is the odontoma.
- Inter-radicular lesions commonly displace or erode teeth.

LIST OF DISEASES

COMMON DISEASES

Odontoma 90

Idiopathic Osteosclerosis 91

Focal Sclerosing Osteomyelitis 92

UNCOMMON DISEASES

Osteoma 93

Calcifying Odontogenic Cyst 94

Cemento-ossifying Fibroma 95

ODONTOMA

SYNONYMS

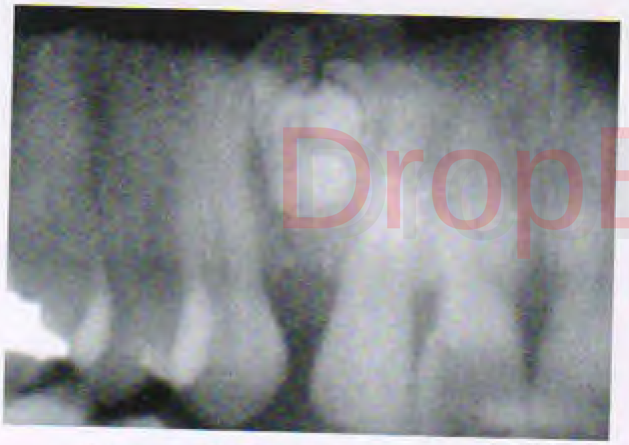
- Compound odontoma
- Complex odontoma

ETIOLOGY

- A benign odontogenic neoplasm that can produce all the tissues found in a mature tooth (enamel, dentin, cementum, and pulp).

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed lesion containing miniature teeth (compound odontoma) or radiopaque masses that do not resemble teeth (complex odontoma).
- More common in the maxilla.



A complex odontoma in the anterior maxilla.

OTHER USEFUL CLINICAL INFORMATION

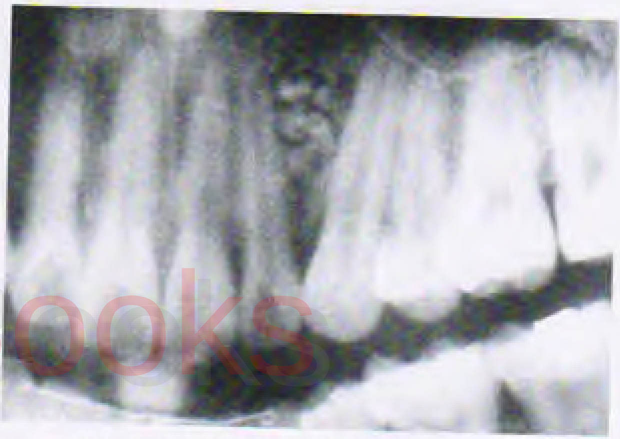
- More common in children and young adults.

DIFFERENTIAL DIAGNOSIS

- Idiopathic osteosclerosis
- Focal sclerosing osteomyelitis
- Osteoma
- Calcifying odontogenic cyst
- Cemento-ossifying fibroma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A complex odontoma in the anterior maxilla.

TREATMENT RECOMMENDATIONS

- Surgical enucleation

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Odontomas can occasionally be associated with dentigerous cysts and calcifying odontogenic cysts.

IDIOPATHIC OSTEOSCLEROSIS

SYNONYMS

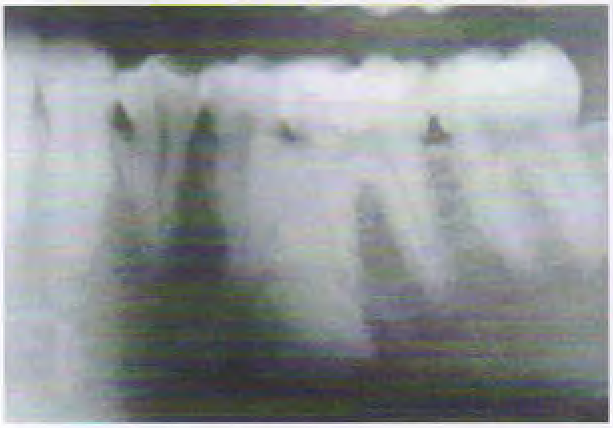
- Osteoporotic scar
- Dense bone island
- Focal periapical osteopetrosis

ETIOLOGY

- Unknown etiology

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiopaque lesion between the roots of adjacent teeth.
- Most often involves mandibular molar teeth.



Idiopathic osteosclerosis. The teeth are asymptomatic and vital.

OTHER USEFUL CLINICAL INFORMATION

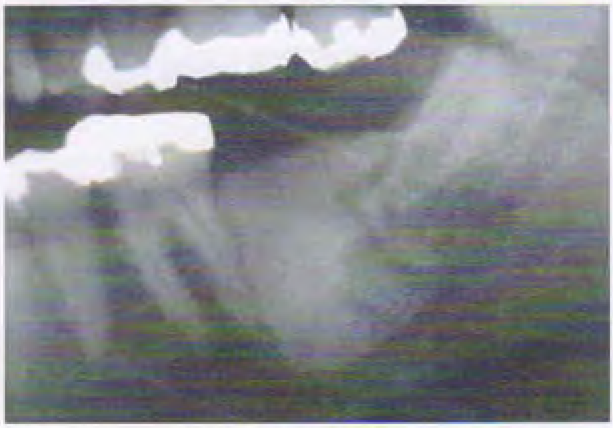
- More common in adults.
- The adjacent teeth are usually free of caries or restorations.
- The adjacent teeth are asymptomatic and vital.

DIFFERENTIAL DIAGNOSIS

- Odontoma
- Focal sclerosing osteomyelitis
- Osteoma
- Calcifying odontogenic cyst
- Cemento-ossifying fibroma

DIAGNOSTIC STEPS

- Percuss the teeth (they will not be sensitive to percussion).
- Test the vitality of the teeth (they will test vital).



Idiopathic osteosclerosis. The tooth is asymptomatic and vital.

TREATMENT RECOMMENDATIONS

- No treatment necessary.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- These lesions may regress in older patients.

FOCAL SCLEROSING OSTEOMYELITIS

SYNONYMS

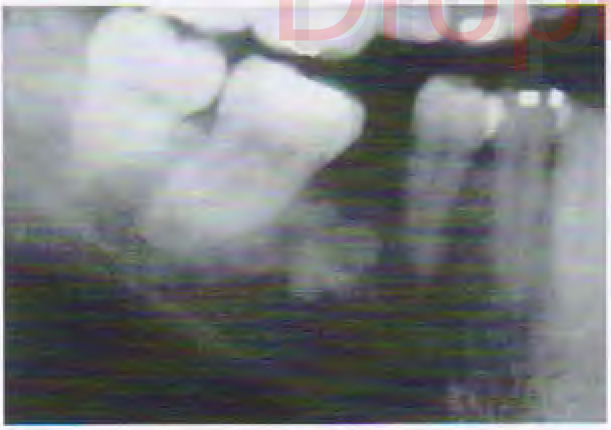
- Focal chronic sclerosing osteomyelitis
- Condensing osteitis

ETIOLOGY

- Chronic osteomyelitis that develops at the root apex of a tooth with chronic pulpitis secondary to deep caries
- The lesion may extend into the inter-radicular alveolar bone.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiopaque lesion between the roots of adjacent teeth with caries or large restorations
- A distinct periodontal membrane space is usually present (the radiopacity does not appear to merge with the cementum of the root apex).
- A radiolucent margin may surround the radiopacity.



Focal sclerosing osteomyelitis. The patient complained of a dull toothache.

OTHER USEFUL CLINICAL INFORMATION

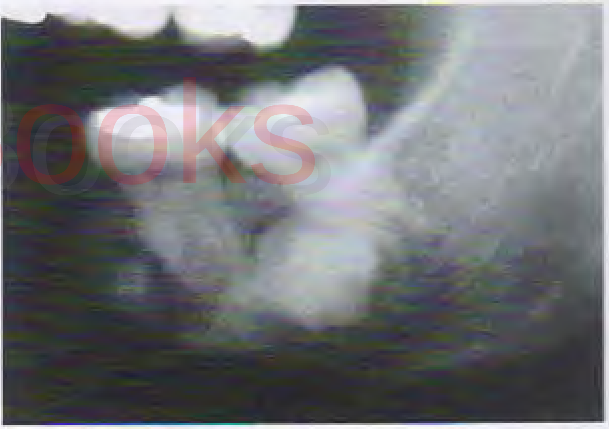
- Mandibular premolar or molar teeth are the most frequently involved.
- The teeth may be asymptomatic, or there may be chronic pain of low intensity.
- The teeth are usually not sensitive to percussion.
- The teeth are usually vital.

DIFFERENTIAL DIAGNOSIS

- Odontoma
- Idiopathic osteosclerosis
- Osteoma
- Calcifying odontogenic cyst
- Cemento-ossifying fibroma

DIAGNOSTIC STEPS

- Percuss the teeth (they should not be sensitive to percussion).
- Test the vitality of the teeth (they should test vital, but the pulpal response may be altered).
- Microscopic examination of periapical tissue necessary to confirm the diagnosis.



Focal sclerosing osteomyelitis. The patient complained of a dull toothache.

TREATMENT RECOMMENDATIONS

- Endodontic therapy if the teeth are restorable.
- Extraction if the teeth are not restorable.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Early lesions appear as periapical radiolucencies.

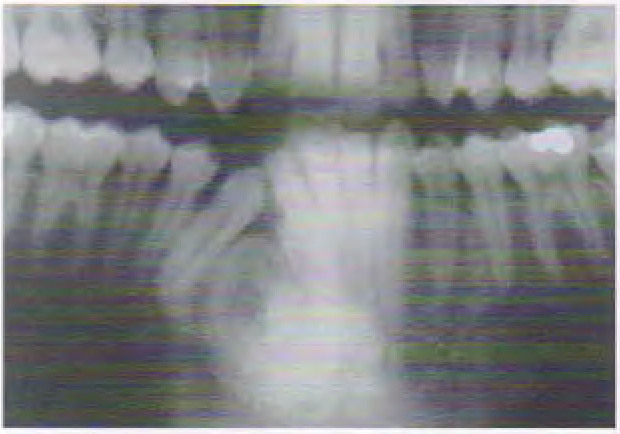
OSTEOMA

ETIOLOGY

- A benign neoplasm of osteoblasts

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiopaque lesion
- May displace adjacent tooth roots



An osteoma in the anterior mandible. The lesion is displacing adjacent tooth roots.

OTHER USEFUL CLINICAL INFORMATION

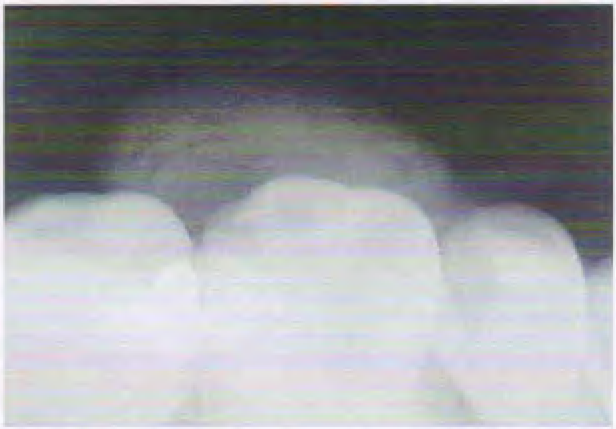
- More common in young adults.

DIFFERENTIAL DIAGNOSIS

- Odontoma
- Idiopathic osteosclerosis
- Focal sclerosing osteomyelitis
- Calcifying odontogenic cyst
- Cemento-ossifying fibroma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A mandibular osteoma in a patient with Gardner's syndrome.

TREATMENT RECOMMENDATIONS

- Surgical excision

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Multiple osteomas can be a component of Gardner's syndrome (other components of the syndrome include multiple unerupted normal and supernumerary teeth, and intestinal polyps that may develop into adenocarcinoma).

CALCIFYING ODONTOGENIC CYST

SYNONYMS

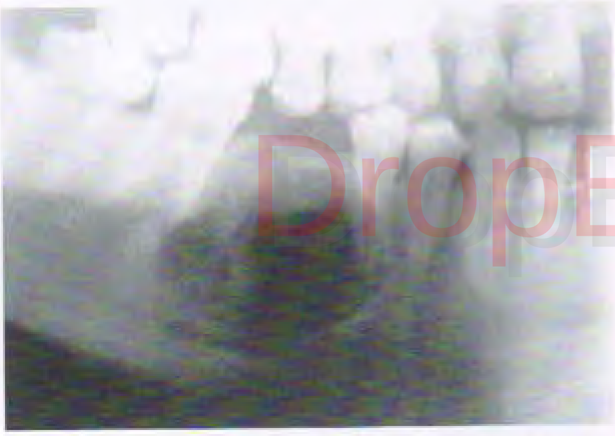
- Gorlin cyst

ETIOLOGY

- A developmental cyst that arises from tooth-forming epithelium
- Inter-radicular lesions develop from remnants of the dental lamina (rests of Serres).

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular lesion with focal or diffuse calcifications producing a mixed radiolucent-radiopaque appearance.
- May cause erosion of the roots of adjacent teeth.



A calcifying odontogenic cyst in the posterior mandible.

OTHER USEFUL CLINICAL INFORMATION

- More common in young adults.
- May be associated with cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Odontoma
- Idiopathic osteosclerosis
- Focal sclerosing osteomyelitis
- Osteoma
- Cemento-ossifying fibroma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical enucleation

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Calcifying odontogenic cyst is initially a radiolucent lesion, but eventually, calcifications can develop within the cyst wall producing a mixed radiolucent-radiopaque appearance.
- Calcifying odontogenic cyst may occasionally occur in association with odontomas, adenomatoid odontogenic tumors and ameloblastomas.

CEMENTO-OSSIFYING FIBROMA

SYNONYMS

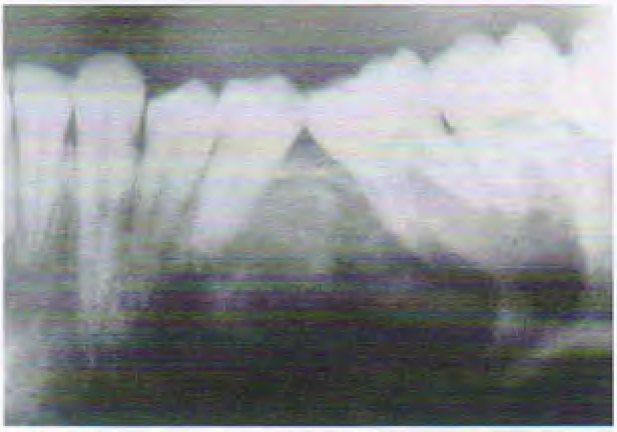
- Cementifying fibroma

ETIOLOGY

- A benign fibro-osseous lesion containing cementum and bone

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed mottled radiopaque lesion
- A thin radiolucent margin is usually visible around the radiopaque mass.
- More common in the posterior mandible.
- May cause resorption or displacement of adjacent tooth roots.



A cemento-ossifying fibroma. The lesion is displacing the roots of adjacent teeth.

OTHER USEFUL CLINICAL INFORMATION

- More common in children and young adults
- Commonly associated with cortical expansion

DIFFERENTIAL DIAGNOSIS

- Odontoma
- Idiopathic osteosclerosis
- Focal sclerosing osteomyelitis
- Osteoma
- Calcifying odontogenic cyst

DIAGNOSTIC STEPS

- Percuss the adjacent teeth (they should not be painful to percussion).
- Test the vitality of adjacent teeth (they should test vital).
- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical enucleation is the treatment of choice.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- An aggressive form of this lesion (juvenile ossifying fibroma) is more likely to recur following conservative therapy.

RADIOPAQUE LESIONS NOT ASSOCIATED WITH TEETH

GENERAL PRINCIPLES

- Radiopaque lesions not associated with teeth can represent inflammatory, dysplastic, metabolic or neoplastic processes.

- These lesions may develop in areas once occupied by teeth (extraction sites) or in parts of the bone separated from existing teeth.

- Focal sclerosing osteomyelitis and florid cemento-osseous dysplasia are often discovered in edentulous areas.

- Some radiopaque lesions not associated with teeth are initially radiolucent (these lesions are also included in the section on radiolucent lesions not associated with teeth).

LIST OF DISEASES

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Florid Cemento-osseous Dysplasia 99

UNCOMMON DISEASES

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Cemento-ossifying Fibroma 101
Fibrous Dysplasia 102
Osteoblastoma 103
Paget's Disease of Bone 104

FOCAL SCLEROSING OSTEOMYELITIS

SYNONYMS

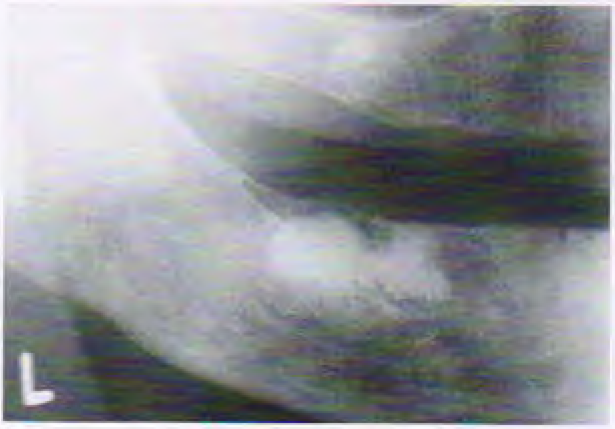
- Focal chronic sclerosing osteomyelitis
- Condensing osteitis

ETIOLOGY

- Chronic osteomyelitis that develops at the root apex of a tooth with chronic pulpitis secondary to deep caries
- The lesion may extend into the inter-radicular alveolar bone.
- If the tooth is removed, the lesion will remain in the bone at the extraction site.

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiopaque lesion in bone at the site of previous tooth extraction.
- A radiolucent margin may surround the radiopacity.



Focal sclerosing osteomyelitis in the posterior mandible.

OTHER USEFUL CLINICAL INFORMATION

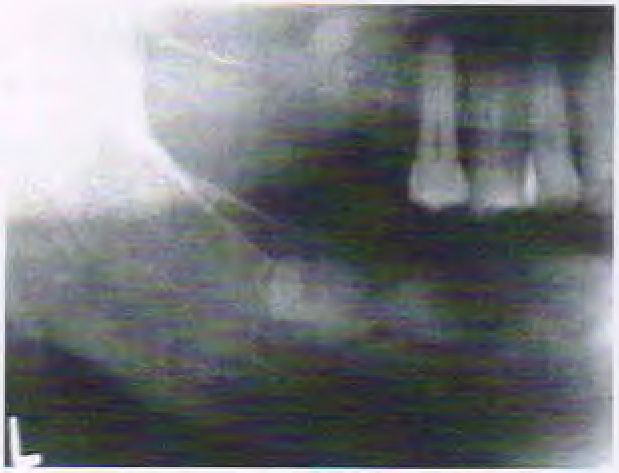
- The mandibular premolar-molar area is the most frequently involved.
- There will be a history of tooth extraction in the area.

DIFFERENTIAL DIAGNOSIS

- Florid cemento-osseous dysplasia
- Osteoma
- Cemento-ossifying fibroma
- Osteoblastoma

DIAGNOSTIC STEPS

- No diagnostic steps other than recognition of typical radiographic features.
- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Focal sclerosing osteomyelitis in the posterior mandible.

TREATMENT RECOMMENDATIONS

- If the offending tooth has been removed and the lesion is asymptomatic, no other treatment is necessary.

FOLLOW-UP

- Periodic re-evaluation.

FLORID CEMENTO-OSSEOUS DYSPLASIA

SYNONYMS

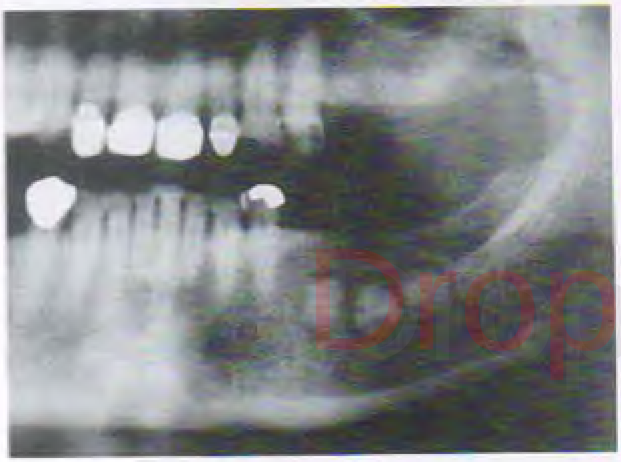
- Cemento-osseous dysplasia

ETIOLOGY

- A reactive proliferation in response to unknown factors

TYPICAL RADIOGRAPHIC FEATURES

- Multiple, circumscribed radiopacities in one or more quadrants
- More common in the posterior mandible.



Florid cemento-osseous dysplasia in the posterior mandible.

OTHER USEFUL CLINICAL INFORMATION

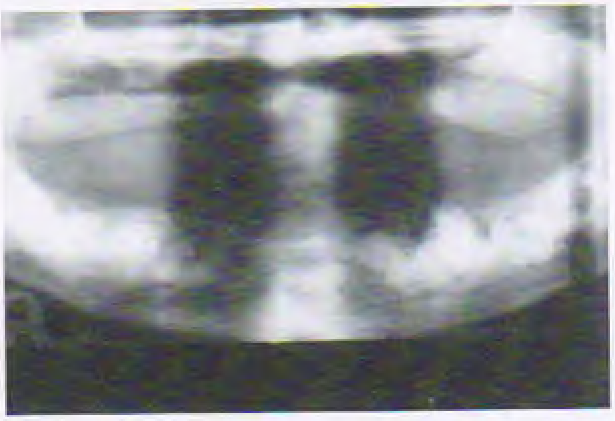
- More common in middle-aged African-American females.
- The lesions are often discovered on routine dental radiographs.
- They are usually asymptomatic, but may occasionally be associated with low-grade chronic discomfort.

DIFFERENTIAL DIAGNOSIS

- Focal sclerosing osteomyelitis
- Osteomas
- Cemento-ossifying fibroma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Florid cemento-osseous dysplasia in the right and left posterior mandible.

TREATMENT RECOMMENDATIONS

- No treatment necessary unless secondarily infected.
- Lesions which become secondarily infected are treated with surgical debridement and systemic antibiotics.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- The initial lesions of florid cemento-osseous dysplasia are radiolucent.
- May be associated with periapical cemento-osseous dysplasia.
- The use of the term dysplasia does not mean that these lesions are premalignant.

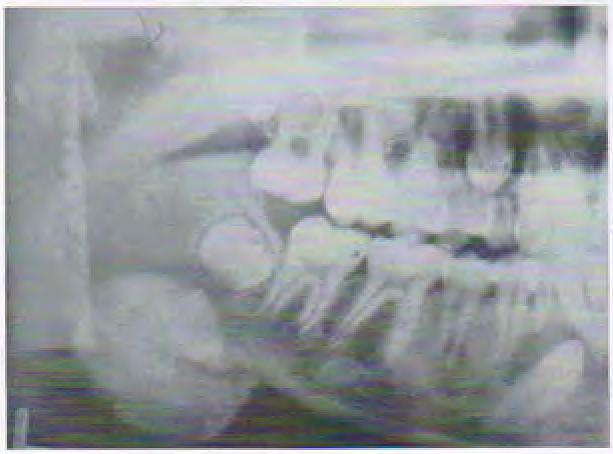
OSTEOMA

ETIOLOGY

- A benign neoplasm of osteoblasts

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiopaque lesion
- May displace adjacent tooth roots



An osteoma in the posterior mandible.

OTHER USEFUL CLINICAL INFORMATION

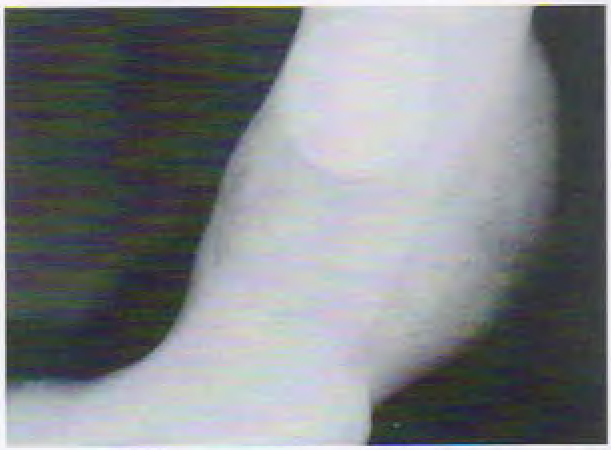
- More common in young adults

DIFFERENTIAL DIAGNOSIS

- Focal sclerosing osteomyelitis
- Florid cemento-osseous dysplasia
- Cemento-ossifying fibroma
- Osteoblastoma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



A mandibular osteoma in a patient with Gardner's syndrome.

TREATMENT RECOMMENDATIONS

- Surgical excision

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Multiple osteomas can be a component of Gardner's syndrome (other components of the syndrome include multiple unerupted normal and supernumerary teeth, and intestinal polyps that may develop into adenocarcinoma).

CEMENTO-OSSIFYING FIBROMA

SYNONYMS

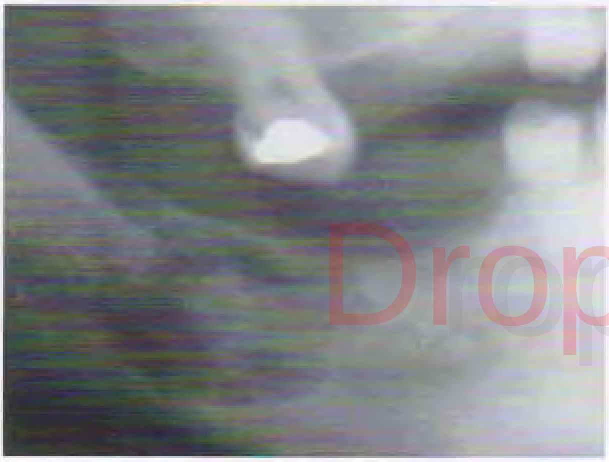
- Cementifying fibroma

ETIOLOGY

- A benign fibro-osseous lesion containing cementum and bone

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed mottled radiopaque lesion
- A thin radiolucent margin is usually visible around the radiopaque mass.
- More common in the posterior mandible.



Cemento-ossifying fibroma in the posterior mandible.

OTHER USEFUL CLINICAL INFORMATION

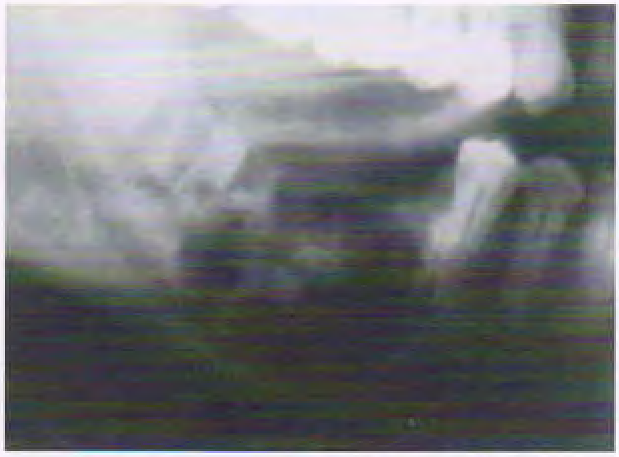
- More common in children and young adults.
- Commonly associated with cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Focal sclerosing osteomyelitis
- Florid cemento-osseous dysplasia
- Osteomas
- Osteoblastoma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Cemento-ossifying fibroma in the posterior mandible.

TREATMENT RECOMMENDATIONS

- Surgical enucleation is the treatment of choice.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- An aggressive form of this lesion (juvenile ossifying fibroma) is more likely to recur following conservative therapy.

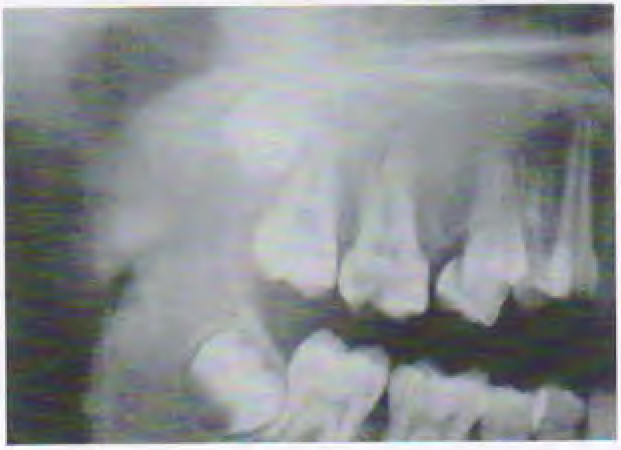
FIBROUS DYSPLASIA

ETIOLOGY

- A benign fibro-osseous lesion of unknown etiology
- The disease can occur as a single lesion (monostotic fibrous dysplasia) or as multiple lesions in many different bones (polyostotic fibrous dysplasia).

TYPICAL RADIOGRAPHIC FEATURES

- A radiopaque lesion with a ground glass appearance and ill-defined margins
- More common in the maxilla.
- Commonly displaces teeth in the area of the lesion.



Monostotic fibrous dysplasia in the posterior maxilla.

OTHER USEFUL CLINICAL INFORMATION

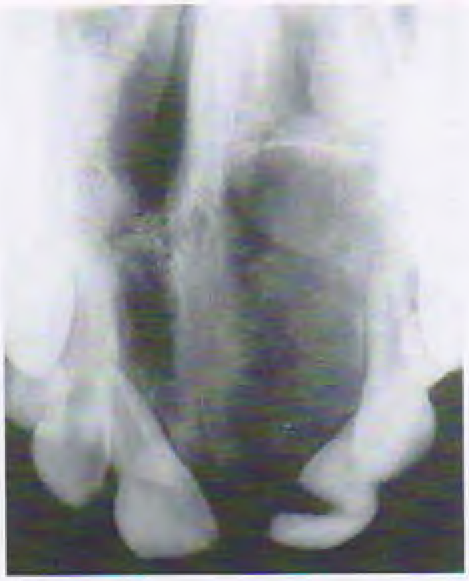
- More common in children and young adults.
- Commonly associated with facial deformity.
- Commonly associated with malocclusion.

DIFFERENTIAL DIAGNOSIS

- Fibrous dysplasia may be confused with Paget's disease of bone.

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Monostotic fibrous dysplasia in the anterior maxilla.

TREATMENT RECOMMENDATIONS

- Once the patient has reached skeletal maturation, cosmetic surgery can be used to treat facial deformities.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- Polyostotic fibrous dysplasia is often associated with endocrine disorders and pigmented skin lesions called café au lait spots.

OSTEOBLASTOMA

SYNONYMS

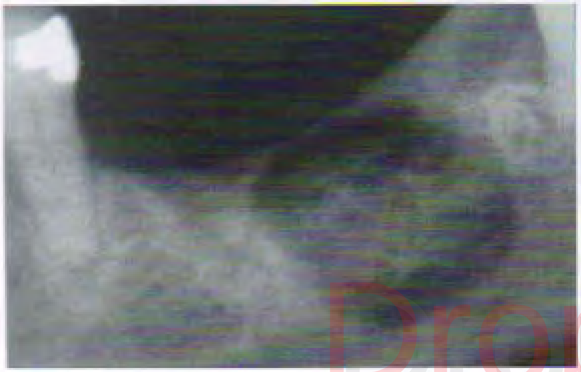
- Benign osteoblastoma

ETIOLOGY

- A benign neoplasm of osteoblasts

TYPICAL RADIOGRAPHIC FEATURES

- A well-defined lesion with irregular areas of radiopacity.
- May expand and destroy cortical bone.



An osteoblastoma in the posterior mandible.

OTHER USEFUL CLINICAL INFORMATION

- Usually painful.
- More common in young adult males.
- More common in the mandible.

DIFFERENTIAL DIAGNOSIS

- Osteoma
- Focal sclerosing osteomyelitis
- Cemento-ossifying fibroma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical excision

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- In older patients, osteoblastomas may occasionally exhibit more aggressive growth.

PAGET'S DISEASE OF BONE

SYNONYMS

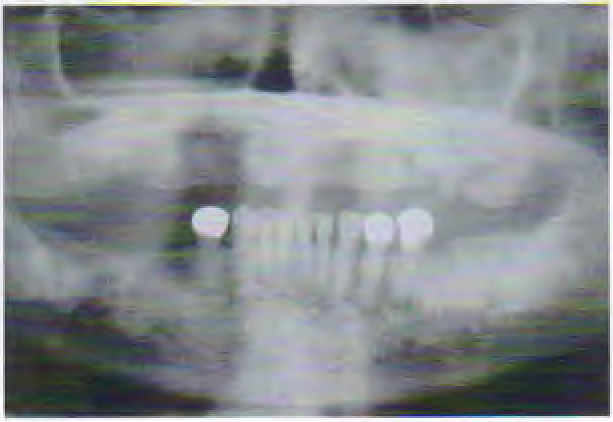
- Osteitis deformans

ETIOLOGY

- A metabolic bone disease of unknown etiology

TYPICAL RADIOGRAPHIC FEATURES

- Multiple radiopaque masses giving the appearance of cotton wool (cotton balls).
- More common in the maxilla.
- Teeth adjacent to the lesions commonly exhibit hypercementosis.



Paget's disease in the maxilla and mandible.

OTHER USEFUL CLINICAL INFORMATION

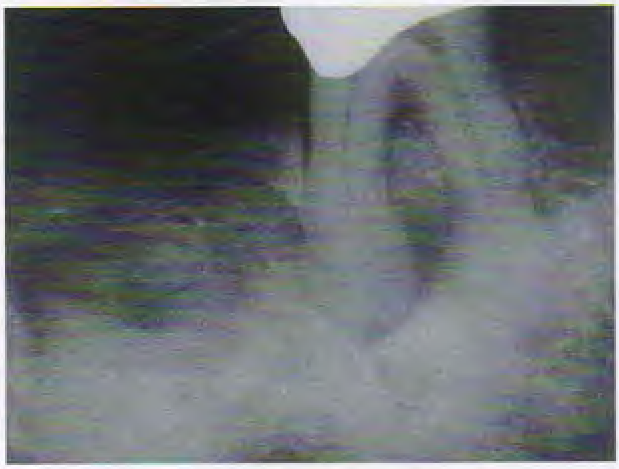
- More common in middle-aged and elderly adults.
- Commonly associated with facial deformity.
- May cause the movement of teeth.
- May be associated with bone pain.

DIFFERENTIAL DIAGNOSIS

- Paget's disease of bone may be confused with fibrous dysplasia.

DIAGNOSTIC STEPS

- Elevated levels of serum alkaline phosphatase is encountered in patients with Paget's disease of bone.
- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Hypercementosis in a patient with Paget's disease.

TREATMENT RECOMMENDATIONS

- Asymptomatic patients are usually not treated.
- In symptomatic patients, medications which inhibit bone resorption may be of temporary benefit.
- Surgical therapy is occasionally used to relieve pressure on nerves.

FOLLOW-UP

- Long-term follow-up is essential.

CLINICAL SIGNIFICANCE

- Lesions involving the base of the skull can impinge on cranial nerves causing blindness and deafness.
- Patients with Paget's disease of bone are at increased risk of developing osteomyelitis and osteogenic sarcoma.

RADIOPAQUE LESIONS WITH IRREGULAR MARGINS

GENERAL PRINCIPLES

- Radiopaque lesions with irregular margins can represent inflammatory processes, primary malignant neoplasms and metastatic malignant neoplasms.
- The most common radiopaque lesions with irregular margins are the result of osteomyelitis.
- The term "mottled" is commonly used to describe the radiographic appearance of these lesions.
- Some radiopaque lesions with irregular margins are initially radiolucent (these lesions are also included in the section on radiolucent lesions with irregular margins).

LIST OF DISEASES

COMMON DISEASES

Osteomyelitis 106

UNCOMMON DISEASES

Osteogenic Sarcoma 107
Metastatic Malignant Neoplasms 108

OSTEOMYELITIS

SYNONYMS

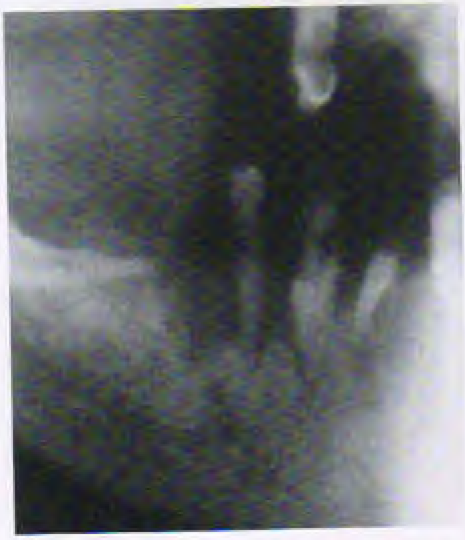
- Chronic osteomyelitis

ETIOLOGY

- May develop from inadequately treated acute osteomyelitis.
- May develop in the absence of an acute phase.
- Sclerotic bone is produced in response to the chronic inflammatory process.

TYPICAL RADIOGRAPHIC FEATURES

- A mottled radiopaque lesion with irregular margins.
- More common in the posterior mandible.
- Fragments of sequestered bone may be apparent.



Chronic osteomyelitis in the posterior mandible.

OTHER USEFUL CLINICAL INFORMATION

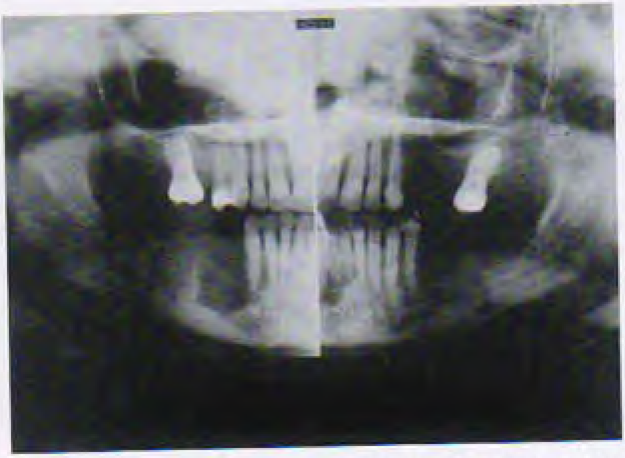
- More common in adults.
- Usually associated with minimal pain.

DIFFERENTIAL DIAGNOSIS

- Osteogenic sarcoma
- Metastatic malignant neoplasms

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Chronic osteomyelitis (osteoradionecrosis) in the right and left mandible. The patient had been irradiated for carcinoma of the posterior tongue.

TREATMENT RECOMMENDATIONS

- Systemic antibiotic therapy

CLINICAL SIGNIFICANCE

- Bone that has been irradiated is especially susceptible to acute osteomyelitis (osteoradionecrosis).
- Patients with Paget's disease of bone are at increased risk for chronic osteomyelitis.

OSTEOGENIC SARCOMA

SYNONYMS

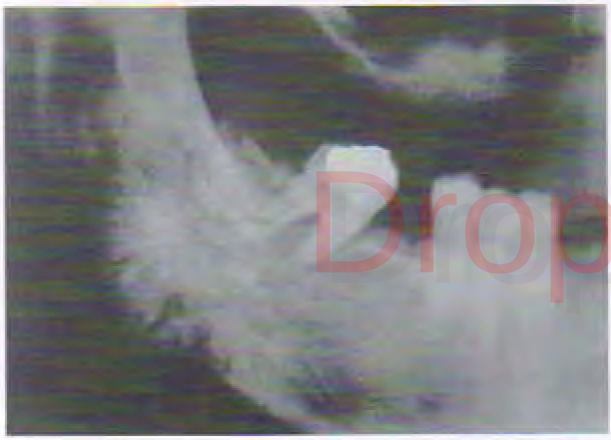
- Osteosarcoma

ETIOLOGY

- A malignant neoplasm of osteoblasts

TYPICAL RADIOGRAPHIC FEATURES

- A mottled radiopaque mass with irregular margins.
- Spicules of bone may radiate from the radiopaque mass producing a sunburst (sunray) pattern.
- More common in the posterior mandible.



Osteogenic sarcoma in the posterior mandible. The lesion exhibited a sunburst (sunray) pattern.

OTHER USEFUL CLINICAL INFORMATION

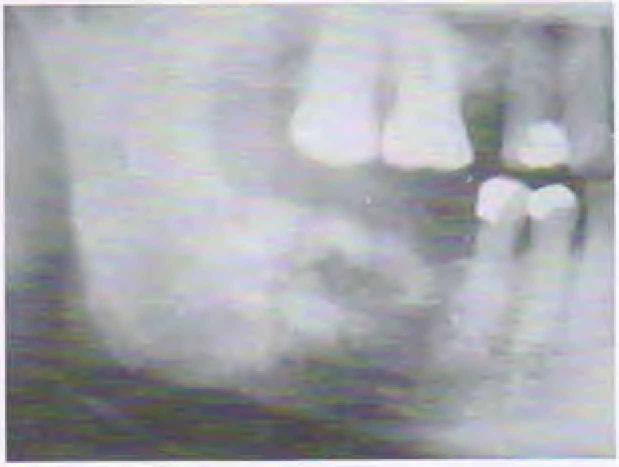
- More common in adult males.
- May be associated with cortical expansion.
- May be associated with local discomfort and paresthesia of the lower lip.

DIFFERENTIAL DIAGNOSIS

- Osteomyelitis
- Metastatic malignant neoplasms

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.



Osteogenic sarcoma in the posterior mandible. The patient complained of paresthesia of the lower lip.

TREATMENT RECOMMENDATIONS

- Surgical resection is the treatment of choice.

FOLLOW-UP

- Because of the aggressive nature of this malignancy, long term follow-up is essential.

CLINICAL SIGNIFICANCE

- The incidence of osteogenic sarcoma is higher in individuals with Paget's disease of bone.
- The prognosis for osteogenic sarcoma of the jaws is better than for osteogenic sarcoma arising in long bones of the skeleton.

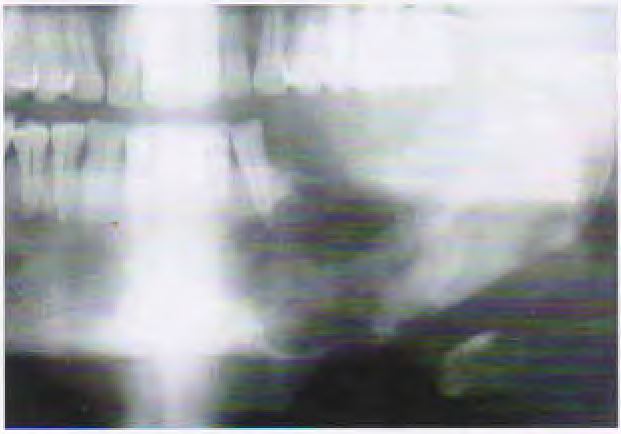
METASTATIC MALIGNANT NEOPLASMS

ETIOLOGY

- Malignant neoplasms can spread through blood vessels (hematogenous metastasis) to the jaws.
- Primary malignancies include carcinomas arising from lung, breast, colon and prostate.
- Metastatic malignant neoplasms can appear radiopaque because of calcifications produced within the tumor, or from reactive bone around the tumor.

TYPICAL RADIOGRAPHIC FEATURES

- A mottled appearance caused by focal radiopacities with irregular radiolucent margins.
- May perforate the cortex to cause a pathologic fracture.
- More common in the posterior mandible.



Metastatic colon cancer in the posterior mandible. The patient complained of paresthesia of the lower lip.

OTHER USEFUL CLINICAL INFORMATION

- More common in adult males.
- May be associated with local discomfort and paresthesia of the lower lip.

DIFFERENTIAL DIAGNOSIS

- Osteomyelitis
- Osteogenic sarcoma

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical resection
- Radiation therapy if clinically warranted

FOLLOW-UP

- Close follow-up is essential

CLINICAL SIGNIFICANCE

- The metastatic lesion may be the first indication of disease.
- Metastatic malignancies to the jaws are associated with a very poor prognosis.

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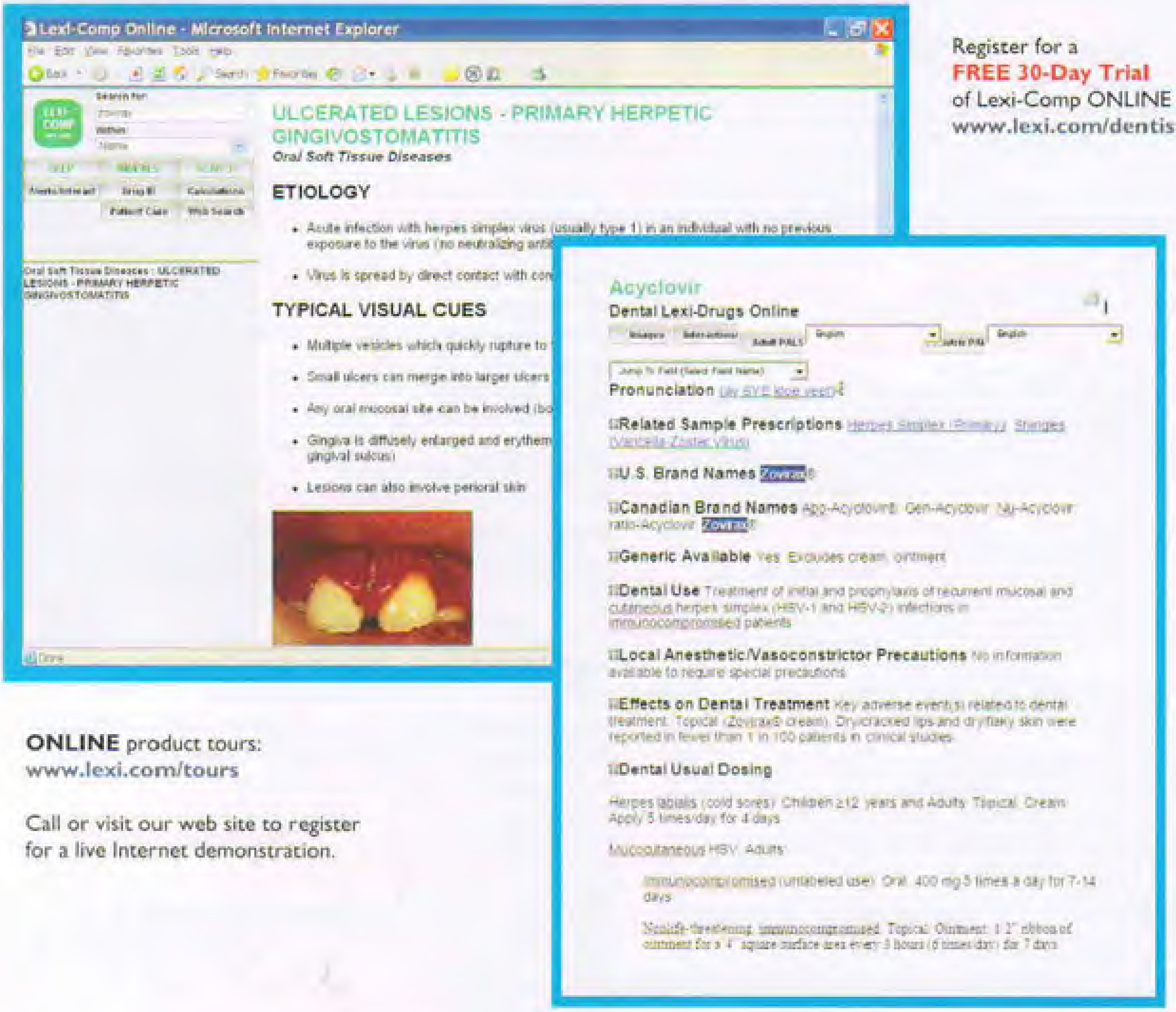

ULCERATED LESIONS - PRIMARY HERPETIC GINGIVOSTOMATITIS

Oral Soft Tissue Diseases

ETIOLOGY

- Acute infection with herpes simplex virus (usually type 1) in an individual with no previous exposure to the virus (no neutralizing anti
- Virus is spread by direct contact with con

TYPICAL VISUAL CUES

- Multiple vesicles which quickly rupture to
- Small ulcers can merge into larger ulcers
- Any oral mucosal site can be involved (bo
- Gingiva is diffusely enlarged and erythem gingival sulcus)
- Lesions can also involve perioral skin

Acyclovir

Dental Lexi-Drugs Online

Pronunciation (ay SYE kloe veer)

Related Sample Prescriptions Herpes Simplex (Primary); Shingles (Varicella-Zoster Virus)

U.S. Brand Names Zovirax®

Canadian Brand Names Apo-Acyclovir®; Gen-Acyclovir; Nu-Acyclovir; ratio-Acyclovir; Zovirax®

Generic Available Yes: Excludes cream, ointment

Dental Use Treatment of initial and prophylaxis of recurrent mucosal and cutaneous herpes simplex (HSV-1 and HSV-2) infections in immunocompromised patients

Local Anesthetic/Vasoconstrictor Precautions No information available to require special precautions

Effects on Dental Treatment Key adverse event(s) related to dental treatment: Topical (Zovirax® cream): Dry/cracked lips and dry/flaky skin were reported in fewer than 1 in 100 patients in clinical studies

Dental Usual Dosing

Herpes labialis (cold sores): Children ≥12 years and Adults: Topical: Cream: Apply 5 times/day for 4 days

Mucocutaneous HSV: Adults:

Immunocompromised (unlabeled use): Oral: 400 mg 5 times a day for 7-14 days

Nonlife-threatening, immunocompromised: Topical: Ointment: 1/2" ribbon of ointment for a 4" square surface area every 3 hours (6 times/day) for 7 days

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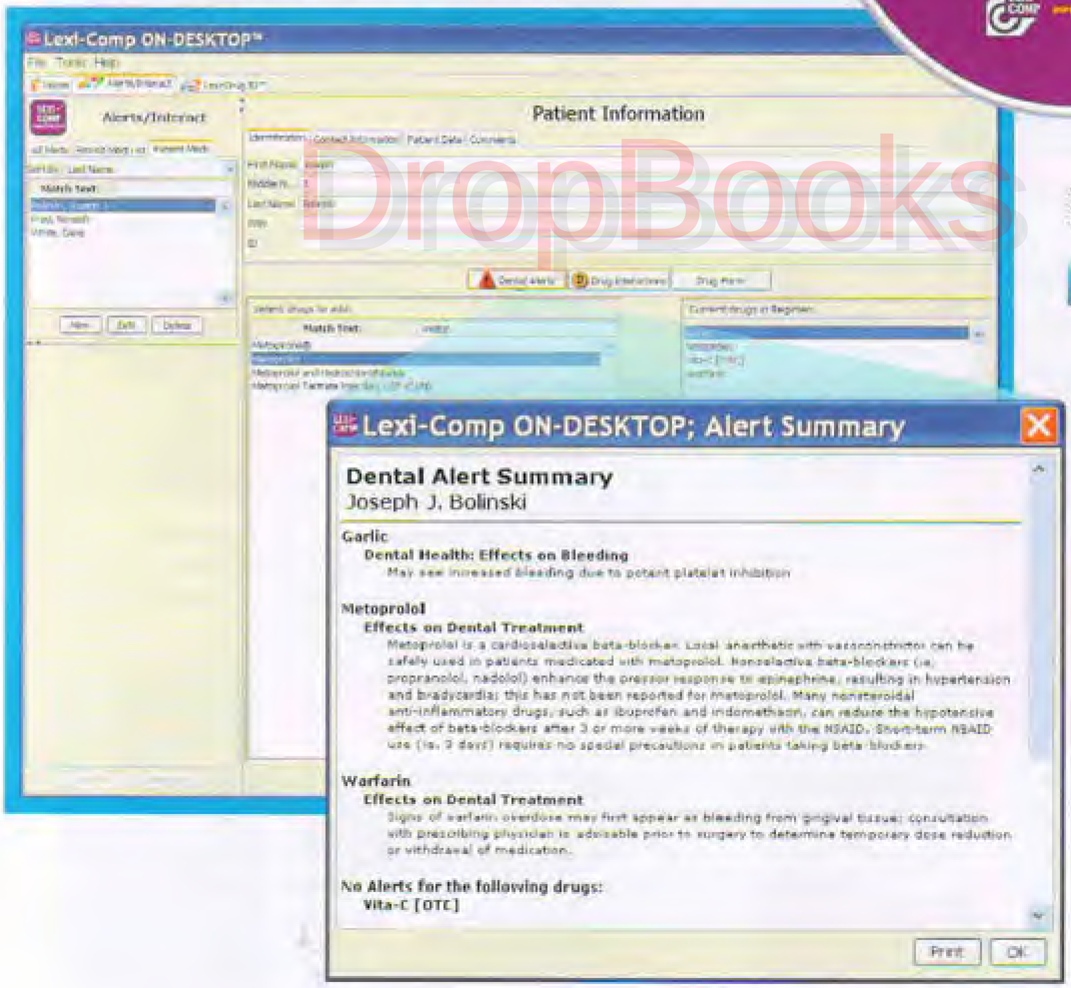

Dental Alert Summary
Joseph J. Bolinski

Garlic
Dental Health: Effects on Bleeding
May see increased bleeding due to potent platelet inhibition

Metoprolol
Effects on Dental Treatment
Metoprolol is a cardioselective beta-blocker. Local anesthetic with vasoconstrictor can be safely used in patients medicated with metoprolol. Nonselective beta-blockers (ie, propranolol, nadolol) enhance the pressor response to epinephrine, resulting in hypertension and bradycardia; this has not been reported for metoprolol. Many nonsteroidal anti-inflammatory drugs, such as ibuprofen and indomethacin, can reduce the hypotensive effect of beta-blockers after 3 or more weeks of therapy with the NSAID. Short-term NSAID use (ie, 3 days) requires no special precautions in patients taking beta-blockers.

Warfarin
Effects on Dental Treatment
Signs of warfarin overdose may first appear as bleeding from gingival tissue; consultation with prescribing physician is advisable prior to surgery to determine temporary dose reduction or withdrawal of medication.

No Alerts for the following drugs:
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Digoxin Jump

Dental Health: Vasoconstrictor/Local Anesthetic Precautions

Use vasoconstrictor with caution due to risk of cardiac arrhythmias with digoxin

Dental Health: Effects on Dental Treatment

Sensitive gag reflex may cause difficulty in taking a dental

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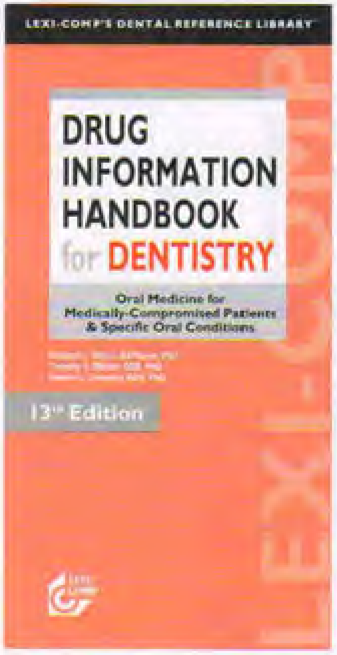
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Contents

1) Introduction
2) Alphabetical Listing of Drugs
3) Herbs / Natural Products
4) Medically-Compromised Patients
5) Specific Oral Conditions
6) Sample Prescriptions
7) Appendix
8) Pharmacologic Category Index
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CALCIFYING ODONTOGENIC CYST

SYNONYMS

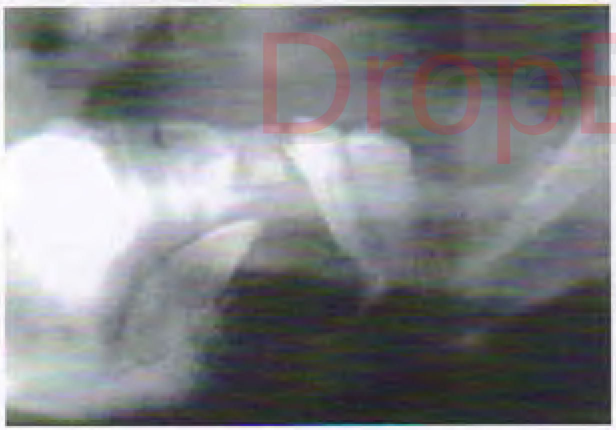
- Gorlin cyst

ETIOLOGY

- A developmental cyst that arises from tooth-forming epithelium
- Pericoronal lesions develop from reduced enamel epithelium of the dental follicle

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed unilocular lesion with focal or diffuse calcifications producing a mixed radiolucent-radiopaque appearance
- Most often associated with an unerupted cuspid.
- May cause erosion of the roots of adjacent teeth.



A calcifying odontogenic cyst associated with an unerupted mandibular cuspid tooth.

OTHER USEFUL CLINICAL INFORMATION

- More common in young adults.
- May be associated with cortical expansion.

DIFFERENTIAL DIAGNOSIS

- Odontoma
- Adenomatoid odontogenic tumor
- Calcifying epithelial odontogenic tumor

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical enucleation

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- A calcifying odontogenic cyst is initially a radiolucent lesion, but eventually, calcifications can develop within the cyst wall producing a mixed radiolucent-radiopaque appearance.
- A calcifying odontogenic cyst may occasionally occur in association with odontomas, adenomatoid odontogenic tumors, and ameloblastomas.

CALCIFYING EPITHELIAL ODONTOGENIC TUMOR

SYNONYMS

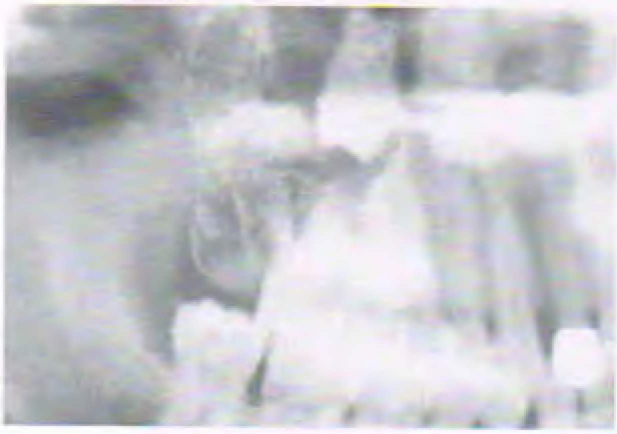
- Pindborg tumor

ETIOLOGY

- A benign neoplasm that arises from the reduced enamel epithelium that lines the dental follicle or from remnants of the dental lamina

TYPICAL RADIOGRAPHIC FEATURES

- A unilocular or multilocular lesion with focal or diffuse calcifications producing a mixed radiolucent-radiopaque appearance
- Commonly associated with the crown of an unerupted mandibular molar



A calcifying epithelial odontogenic tumor associated with an unerupted maxillary third molar tooth.

OTHER USEFUL CLINICAL INFORMATION

- More common in adults.
- Cortical expansion may be present.

DIFFERENTIAL DIAGNOSIS

- Odontoma
- Adenomatoid odontogenic tumor
- Calcifying odontogenic cyst

DIAGNOSTIC STEPS

- Microscopic examination of the lesion is necessary to confirm the diagnosis.

TREATMENT RECOMMENDATIONS

- Surgical resection is the treatment of choice.

FOLLOW-UP

- Because this neoplasm can exhibit multiple recurrences, close follow-up is advisable.

CLINICAL SIGNIFICANCE

- A calcifying epithelial odontogenic tumor is initially radiolucent, but eventually, calcifications develop within the tumor causing a mixed radiolucent-radiopaque appearance.

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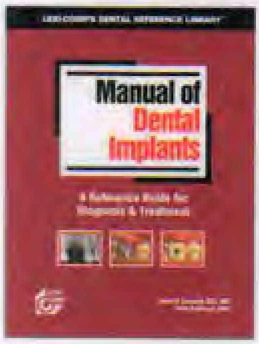

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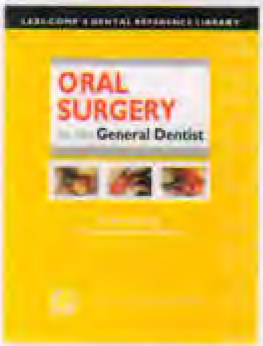

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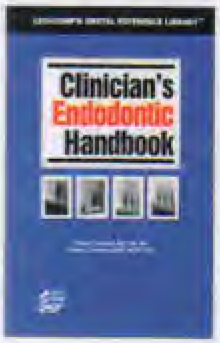

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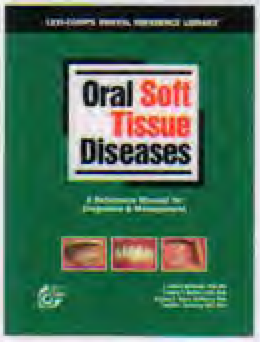
Clinician's Endodontic Handbook

The *Clinician's Endodontic Handbook* was developed as a quick reference to address current issues in endodontic therapy. The latest techniques, procedures, and materials are presented in a concise, easy-to-use format, eliminating the need for multiple textbooks. This is a must have reference for dental practitioners with an interest in endodontics.



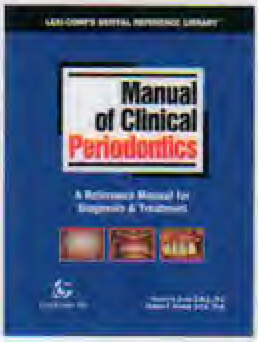
LEXI-COMP'S DENTAL REFERENCE LIBRARY

Oral Soft Tissue Diseases

A Reference Manual for Diagnosis & Management

Oral Soft Tissue Diseases

Oral Soft Tissue Diseases is designed to support the diagnosis and management of oral soft tissue disease in a format that suits the needs of a busy dental practitioner. In this visually-cued manual, each lesion associated with soft tissue disease is illustrated by one or more photographs depicting typical clinical features and common variations. Recommendations for treatment and follow-up, including sample prescriptions and concise drug monographs, are presented.



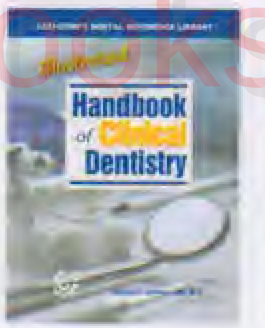
LEXI-COMP'S DENTAL REFERENCE LIBRARY

Manual of Clinical Periodontics

A Reference Manual for Diagnosis & Treatment

Manual of Clinical Periodontics

The *Manual of Clinical Periodontics* is written as a quick and easy reference for many of the clinical problems that challenge all practitioners and students of periodontics. The information in this book is presented in a question-and-answer format, making it a practical resource for both the general clinical practice and in an educational setting. Spiral bound and tabbed for easy access to the desired information.

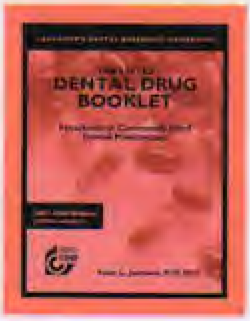


LEXI-COMP'S DENTAL REFERENCE LIBRARY

Illustrated Handbook of Clinical Dentistry

Illustrated Handbook of Clinical Dentistry

The *Illustrated Handbook of Clinical Dentistry* is a concise yet comprehensive resource for all dentists and dental students. This manual summarizes many basic dental principles and procedures and is designed to be used when transitioning into clinical practice or as a refresher for the seasoned dental professional.



THE LITTLE DENTAL DRUG BOOKLET

The Little Dental Drug Booklet

The Little Dental Drug Booklet is a pocket-sized reference to the drugs most commonly used in dental practice. The information provided in this booklet includes practical, practice-oriented suggestions made by dental professionals. A section on prescription writing and prescription requirements is included.

IDIOPATHIC OSTEOSCLEROSIS

SYNONYMS

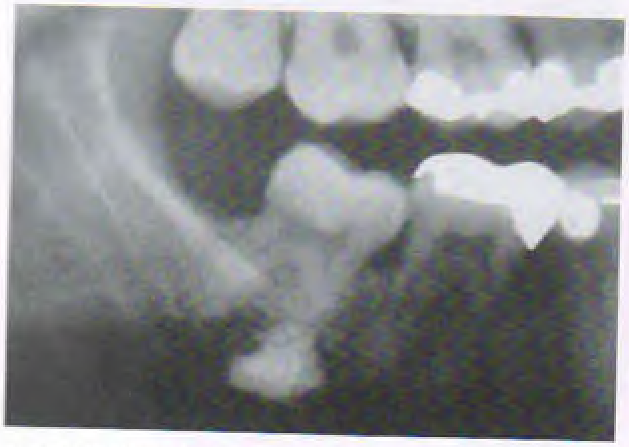
- Osteoporotic scar
- Dense bone island
- Focal periapical osteopetrosis

ETIOLOGY

- Unknown etiology

TYPICAL RADIOGRAPHIC FEATURES

- A circumscribed radiopaque lesion at the root apex
- Most often involves mandibular molar teeth



Idiopathic osteosclerosis. The tooth is asymptomatic and vital.

OTHER USEFUL CLINICAL INFORMATION

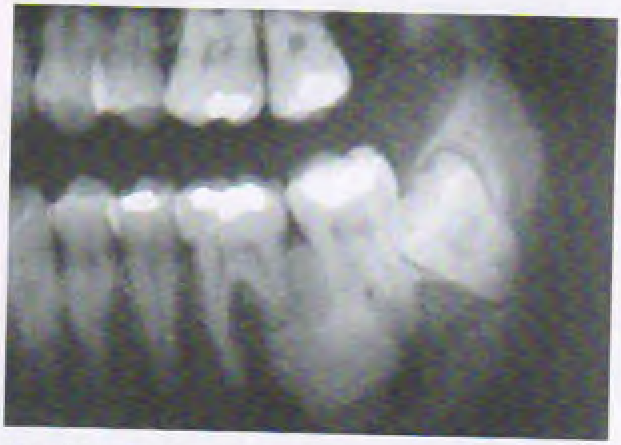
- More common in adults.
- The tooth is usually free of caries or restorations.
- The tooth is asymptomatic and vital.

DIFFERENTIAL DIAGNOSIS

- Periapical cemento-osseous dysplasia
- Focal sclerosing osteomyelitis
- Cementoblastoma
- Cemento-ossifying fibroma

DIAGNOSTIC STEPS

- Percuss the tooth (it will not be sensitive to percussion).
- Test the vitality of the tooth (it will test vital).



Idiopathic osteosclerosis. The teeth are asymptomatic and vital.

TREATMENT RECOMMENDATIONS

- No treatment necessary.

FOLLOW-UP

- Periodic re-evaluation.

CLINICAL SIGNIFICANCE

- These lesions may regress in older patients.

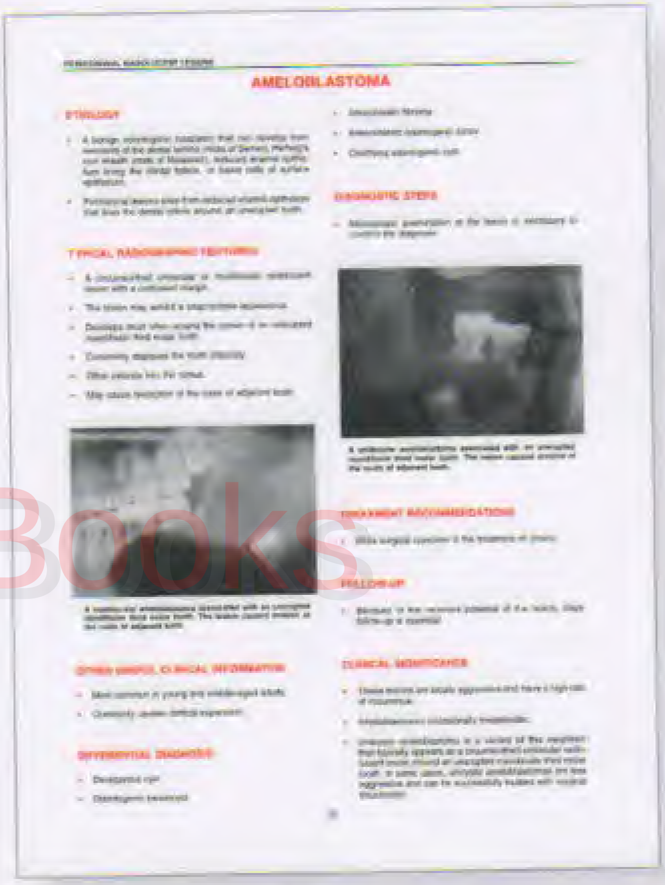
PERIAPICAL RADIOLUCENT LESIONS
PERICORONAL RADIOLUCENT LESIONS
INTER-RADICULAR RADIOLUCENT LESIONS
PERIODONTAL RADIOLUCENT LESIONS
RADIOLUCENT LESIONS NOT ASSOCIATED WITH TEETH
RADIOLUCENT LESIONS WITH IRREGULAR MARGINS
PERIAPICAL RADIOPAQUE LESIONS
PERICORONAL RADIOPAQUE LESIONS
INTER-RADICULAR RADIOPAQUE LESIONS
RADIOPAQUE LESIONS NOT ASSOCIATED WITH TEETH
RADIOPAQUE LESIONS WITH IRREGULAR MARGINS
SELECTED READINGS / INDEX

LEXI-COMP'S DENTAL REFERENCE LIBRARY™

Oral Hard Tissue Diseases, 2nd Edition, is designed as a quick reference manual for the visual recognition and diagnosis of common bone lesions. Each tabbed section is devoted to a specific diagnostic category of lesion and illustrated with black and white photographs of typical radiographic features. New to this edition are six additional lesions and eight new radiographs.

FEATURES

- Over 135 high-quality radiographs
- Etiology, Typical Radiographic Features, Differential Diagnosis, and Clinical Significance are discussed for each legion type
- Recommendations for treatment and follow-up
- Alphabetical Index


AMELOBLASTOMA

Sample page

CONTENTS

- Periapical Radiolucent Lesions
- Pericoronal Radiolucent Lesions
- Inter-radicular Radiolucent Lesions
- Periodontal Radiolucent Lesions
- Radiolucent Lesions Not Associated With Teeth
- Radiolucent Lesions With Irregular Margins
- Periapical Radiopaque Lesions
- Pericoronal Radiopaque Lesions
- Inter-radicular Radiopaque Lesions
- Radiopaque Lesions Not Associated With Teeth
- Radiopaque Lesions With Irregular Margins
- Selected Readings/Index

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